

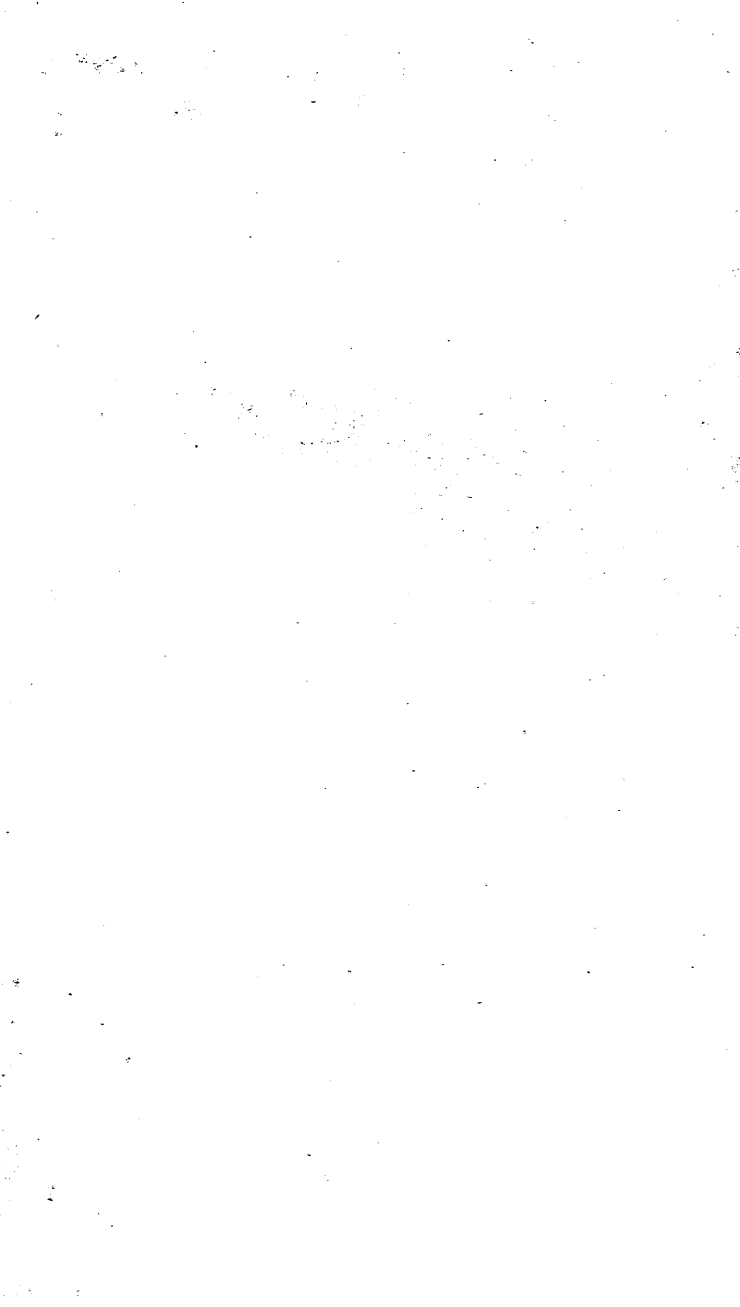
THE GODS OF OLD
AND THE STORY
THAT THEY TELL

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THE GODS OF OLD;

AND THE STORY THAT THEY TELL.

THE GODS OF OLD;

AND THE

STORY THAT THEY TELL.

BY

REV. JAMES A. FITZ SIMON,
11

AND

VINCENT A. FITZ SIMON, M.D.

"In nova fert animus mutatas dicere formas
Corpora." Ovid, Met. I. 1.

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INTRODUCTION.

It would be difficult to find a single branch of knowledge in which we are not more or less indebted to the writers of pre-christian times. They excelled us in some things, such as poetry, painting, sculpture, oratory, and logic ; in others they were our equals ; and in others still they pointed out the way.

What strikes us particularly, however, is their system, or rather systems, of Philosophy, in which they follow matter and force and mind to their ultimate grounds in the endeavour to satisfy those two innate feelings, "to know," and "to worship," implanted in the breast of man. For a period extending over 300 years we have an uninterrupted succession of schools and systems, founded by such men as Zeno the Stoic, who flourished 260 B.C., Epicurus, Aristotle, Plato, Socrates, Protagoras, Empedocles, Democritus, Anaxagoras, Heraclitus, Xenophanes, Pythagoras, Anaximenes, Anaximander, and Thales who is supposed to have been born 636 B.C.

Of all these the Ionic school, founded by Thales, was the oldest, and its followers referred the origin and constitution of the universe as a whole to a single primordial principle which Thales called *water*, Anaximenes *air*, Heraclitus *fire*, or a clear light fluid "self-kindled and self-extinguished," and Anaximander called ἀρχή, "the unlimited, eternal, and unconditioned" material which embraced all things, from which the cold, warm, dry, and moist of all things were secreted, and into which all things were resolved on their dissolution.

However differently all these may sound, they refer to one sensuous principle, namely, that simplest form of visible matter as seen in the heavens and called *nebulous*,

which we ourselves, like Thales, Anaximenes, and Heraclitus, describe indifferently as *misty*, or *gaseous*, or “a *fire-mist*,” or, like Anaximander, as the condition of our universe in the *beginning*, when it was one universal whole, an indefinitely extended mass, exempt from addition or annihilation, and homogeneous,—a whole from which all things were evolved, and to which all things will finally return when suns grow cold and stellar bodies lose their way. In brief language, the Ionian philosophy of some twenty-five centuries or so ago, disguise it as we may, was nothing more nor less than the famous “Nebular Hypothesis” of our own day.

In addition to this physical knowledge, Thales is also credited with having maintained the unity of the world, the immortality of the soul, and the personality of God. It is on record that he calculated an eclipse of the sun, turned the course of the river Halys, excelled in mathematics, and signalised himself so much by his prudence, learning, and knowledge as to be numbered among the Seven Sages. From whom did he get this knowledge? As the founder of the Ionic school he stands at the head of Philosophy, and there is no mention of an immediate predecessor from whom he could derive instruction. Aristotle, however, when writing of Thales, suggests that his primordial principle, “water,” was derived from the teachings of “the old theologians,” and by these he is supposed to allude to Homer and Hesiod. If so, it points to a Dark Age in Grecian literature extending from the time of Thales to that of the above-named poets, an interval of at least 300 years, and consequently pushes knowledge back to about 1000 B.C.

And, again, from whom did Hesiod and Homer derive their knowledge? No one art or science, poetry least of all, can flourish extensively at the expense of others, and judging by the Theogony, Iliad, and Odyssey, we must suppose the age their writers lived in to be characterised by profound thought and advanced knowledge. But those works are closed books; they make no mention of other writers nor of schools of learning; and those works are the sole remnants that we have of their own and of preceding ages.

Now, the one only inheritance which we find those two poets receiving from the wise who lived before them, and which they in turn handed down to Thales and his successors, is a bare list of words or names of divinities around which is woven all the Theogony, the greater part of the Iliad and Odyssey, and much of the poetry from the days of Grecian Thales to those of the Roman Cæsars, the whole constituting what is commonly called Mythology.

The question for consideration is, "What do these names stand for?"

All that we know of them may be stated thus:—

1. They are of unknown antiquity, the all that has been saved from the wreck of ages. If the survival of the fittest holds good for literature as it does for species, then must these names stand for what was best in knowledge.

2. Many of them, such as Gæa, Uranus, Æther, Kronos, Helios, Selene, &c., are, even at first sight, strikingly suggestive of the heavens and the earth; many more, considered derivationally, point quickly to the same conclusion. The inference is, consequently, that all the names are connected more or less intimately with the matter and force of our universe in the whole and in the part.

3. They are not a loose assemblage of disconnected words. Each one is dependent for its being on another, that on another, and so on, till by a chain of cause and effect we finally arrive at Chaos. This Chaos heads the list; from it flow all the others, and to it can all the others be traced. It is thus to the names what the primordial principle is to Philosophy, the beginning and the end of all.

4. In this Chaos, as Hesiod tells us, were Gæa and Eros.

Now supposing, as will be rendered plainer later on, that these words stand for matter and force, then a Chaos, or first principle, that contained matter and force is an additional proof that the mythological names are closely connected with the construction of the universe and of earth.

5. The names, in connection no doubt with what they meant, commended themselves for preservation, amplification, and detailed description to Hesiod and Homer, and through them to the founders and disciples of every

school of ancient philosophy, to poets and statesmen, artists and mathematicians, in short to the cultured of every clime where Greece and Rome held sway. The number of names, too, was being continually added to, each writer coining as it were a divinity of his own. This widespread sanction, adoption, and multiplication can only be accounted for in one of three ways, namely, that the words symbolised religious knowledge, scientific knowledge, or the two combined. So far as multiplication alone is considered, it is a very strong proof that the names related to scientific knowledge, since the nomenclature of each and every branch of science must necessarily increase with time and progress.

6. There is no doubt whatsoever that to the masses at large the words represented so many potential deities to be adored and worshipped, and thus constituted a Pagan system of religion.

7. But with the educated it was different. A belief in One Supreme Being seems never to have been lost sight of in ancient Greece and Rome, and judging from their own writings Monotheism, not Paganism, must be considered as the religion of the cultured. The following are instances of how undisguised and pervading this belief in One God was :—

Εἷς ἐστ' αὐτογενής, ἐνὸς ἔκγονα πάντα τέτυκται.—Orpheus.

One is the self-begotten, and all things

Derived from this same One created were

Ἐγὼ εἰμι πᾶν τὸ γεγονὸς καὶ ὄν, καὶ ἐσόμενον.

“I am all that was, and is, and will be,”—

an inscription placed publicly on a temple at Sais. These two voice the religious feeling of early times ; this, translated from Seneca (*Nat. Quæst.* II. 45), is a fair exponent of his own and preceding days :—

“The wisest among men understand him whom we call Jove to be the guardian and ruler, soul and spirit, of the universe, the lord and maker of this mundane sphere, and one to whom every name is applicable. Dost wish to call him Fate? Thou wilt not err. He it is on whom all things are dependent, from whom are all the causes of causes. Dost wish to call him Providence? Rightly wilt thou do so ; for by his counsel it is that provision is made for this world, so that it may proceed in orderly fashion and unfold his deeds to view. Dost

wish to call him Nature? Thou wilt commit no sin; for he it is from whom all things are sprung, and by whose spirit we breathe life. Dost wish to call him the World? Thou wilt not be mistaken; for he, the all that thou dost behold, is all infused in its parts, and self-existing by power his own."

8. Since the mythological names, then, did not appeal directly to a One Supreme Being in the minds of the educated, there is nothing else left for them to appeal to except Philosophy; and this same Philosophy, then as now, may have constituted the entire religion of the atheistically inclined, or been cultivated as a means of understanding the Creator better through His works among those who believed in and worshipped a One True God. Their God and their gods were very different, and their worship of the latter must be taken in a very restricted sense. As being the works of God, they felt themselves quite free to respect and speak well of such, and so to avoid the wrath of rulers and the mob. To raise an altar to Bacchus or a temple to Mars had probably no more significance in their eyes than it has in ours to erect a university or build an arsenal.

The conclusions deducible from all these points may be thus summed up. The mythological names are but word-pictures of a condensed knowledge that has immediate reference to the construction of the universe, of earth, and to the things of earth. Much of this knowledge is very old; in its written form it was as old as Hesiod and Homer; its traditional form, while ending, it may be, with the days in which these poets lived, goes back, for aught we know to the contrary, to Noah—to Adam even—certainly to the first man or men who deemed it wise and profitable to know and study the works of God, and to tell his or their children by word of mouth the ends for which the world and mankind were made.

On this presumption, that the names of the divinities are really but the nomenclature of science, we can readily understand the fascination which they held for the cultured of every age and country. On and around these kernels of knowledge they could safely weave story after story, which would either describe or amplify existing scientific truths or add to the general store such information as time,

progress, and research would necessarily bring to being. It was a glorious field for philosophical tillage, and each writer readily availed himself of the means provided so as to exhibit his own knowledge of the past and present, and pit his skill with others in the art of myth-making. No mean art was this either, since a myth, to prove successful and acceptable, should be perfectly true to science, and still capable of being read by the vulgar throng according to its light. And if it was a fascinating pursuit for pure science to thus mystify the ignorant pagan, we may fancy how much more fascinating it would be for religious enthusiasm to mystify the atheistical scientist!

With the remark that such a feat was actually accomplished, let us pass to the word Mythology itself, which means "the story of the *μῦθος*."

What is this *μῦθος*? Lexically defined it is "a legend," "words or speech," and especially words or speech handed down by word of mouth, that is "tradition." Derivationally considered it would imply (*μύω* or *μυέω θεῖος*) "the murmuring, pondering over, or initiation into things divine," and hence true; or *μῦθος* may be but a transposed form of *ἔτυμος*, "true, real," and as in our own term "etymology," would have reference to *radical truths* condensed as far as possible into short speech, individual words, or word-pictures.

Mythology would thus mean "the story of the legends" for the uneducated, and "the story of the traditional words" for the educated. The mere scientist would confine the meaning of "traditional words" to knowledge; the religious scientist, while accepting this meaning would extend it to divine truth, to the One God who is "the way, and the truth, and the life." Where the former saw but "the word," the latter would see "the Word"; so that while both travelled on the self-same highway, the religious wayfarer chose to go further than his helpmate on the road.

The main point to be dwelt upon, however, is that, as the philosopher and the poet accepted the traditional names for what they were, the terminology of science, we must naturally regard all that they wrote in prose or verse with respect to these names as genuine science, not as fable.

The first, for all we know to the contrary, to write upon them was Hesiod, and his Theogony may well be considered as the Genesis of Mythology. He begins with Chaos, "the first of all," and ends virtually with Zeus; or in other words, he begins with the primordial principle of Philosophy and ends with life and the struggles of life. This is evidently the story, or rather stories of our earth, for earth has many stories, all of them interesting in their own way, and all of them requisite for the full understanding and proper elaboration of the plan for which it was constructed. Geology begins, or rather ends, the series. It classifies the rocky strata of our globe, describes their materials and mode of arrangement, and tells the causes that have led to and produced such arrangement. It strips the earth for our benefit of its temporal raiment; it removes one by one the Pliocene, Miocene, and Eocene rocks, the Cretaceous, Jurassic, and Triassic, the Carboniferous, Devonian, and Silurian; and while dwelling for a space upon each system and each group, it tells the story of its past, the life forms that graced it, the most remarkable features of the surface, and the great physical events which occurred while it constituted the theatre of life. And so it proceeds till it finally reaches the Archæan granite, and can go no further.

Then does Astronomy take up the story, telling how, previous to the granite, Earth was probably like what Venus is at present; how before that it was like Jupiter or Saturn, half planet half star; and how earlier still it was even a sun, as bright and hot as that which beams on us to-day.

Then comes Philosophy with its portion of the tale, reasoning out how Earth, the planets, and their Sun were all one nebula at first; how this nebula was previously part and parcel of another, the Milky Way; this of another; and so on till we go back to the beginning of all when Earth and planets, Sun, stars, and nebulae were *all one*, one simple and homogeneous nebulous mass.

A story like unto this triple one is that which Mythology has to tell. The building of our earth from the beginning of created matter is its theme; the Divine Author of that matter is once for all stated distinctly in the title, for while

Genesis means simply "the generations," Theogony means "the generations of God"; matter, force, life, and mind, with all their respective forms, are the gods of old; and the story is told by those other gods of old, Hesiod, Homer, Virgil, Ovid, Horace, and many others who have deservedly won immortality by the telling of the story. How well they tell it is for the reader to judge; but it looks as if there was an immense debt between them and us.

Their noble theme has been ignobled, and their science called idolatry; their personages are vivid word-pictures, as clear and intelligible as the Christian, Great-heart, Giant Despair, and Doubting Castle of Bunyan, but we have closed our eyes and ears to the ideas involved therein; they have furthermore facilitated the explication of those personages by giving their genealogy and progeny, or cause and effect, but this family tree so carefully constructed has little or no meaning in our estimation; they ask for no licence save the poet's own and the sparing adaptation of Greek words to the Latin tongue, as mentioned in the *Ars Poetica* of Horace, but we, often as not, give this licence when not required and refuse it when required; finally, they write the story clearly, and thoroughly in consonance with their theme, but we, having given them a fictitious theme, construe their words to suit our own ideas of this theme,—with the melancholy consequence occasionally that when our ideas grow too prurient, we expurgate the poets' lines! Every Greek and Latin extract in this volume, when translated as they are at present in our schools, painfully accentuates the truth of what we say. Let us hope that the rendering which we offer may appease the shades of those Immortals, and serve as a moiety towards payment of the debt we owe them. *Prosit!*

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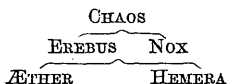
AND THE STORY THAT THEY TELL.

BOOK FIRST.

THE GENESIS OF BEING.

CHAPTER I.

THEOGONY.



MYTHS.

Chaos—a rude and shapeless mass that pre-existed the formation of the world, and out of which the gods, men, and all things arose.

Erebus—son of Chaos, and wedded to his sister Nox.

Nox—daughter of Chaos, and wife of Erebus. The Egyptians esteemed her as the most ancient of the gods. Homer calls her the subduer of gods and men, and a deity of whom Jupiter himself stands in awe.

As the personification of Night, she is represented as venerable and majestic in appearance, crowned with poppies or with stars, equipped with large dark wings and a long robe, and riding in a chariot drawn by two black horses.

Æther—the son of Erebus and Nox, regarded by the poets as the pure upper air and the residence of the gods.

Hemera—daughter of Erebus and Nox, and wedded to Æther, her brother.

CHAPTER II.

THE “*UNUS VULTUS*” OF NATURE.

Chaos.—Our earth represents one extreme of matter and force. For the other, or what is conjectured to be the other, we must go beyond our solar and stellar systems, beyond even the furthest resolvable of the stars, and gaze upon other systems to which the general name of *Nebulæ* has been given from their cloud-like appearance. Some few of these are visible to the naked eye on a clear night, and look like faint patches of cloud or specks of fog. Many of them are resolvable under telescopic power into individual stars, but others have been evoked from the depths of space that appear as faint and misty to the mightiest of our telescopes as those which it resolves appear to the unaided eye.

Science assures us that our solid Earth of to-day, its less solid sister planets and its central sun, were all originally in a nebulous condition. It concludes the same of the fixed stars and of every heavenly body that is visible to the naked eye or the most powerful telescope. It furthermore implies that the *nebulæ* embracing our solar system, each stellar system, and each nebular system, may originally have been one; or in other words that the cluster of worlds which we call the Universe may have been primarily one immense aggregated nebulous mass in which resided all the knowable as well as the unknowable forms of matter and force in their simplest condition.

The composition of those most distant *nebulæ* is, so far, somewhat of a puzzle. The combined efforts of telescope and spectroscope have tracked the regular sequence of Earth from planet, planet from star, and star from “star-dust.” But beyond this star-dust, or the diffused gaseous material

of which the nebulae are made up, their efforts have been powerless. "Probably gaseous" and "probably not gaseous" are the more or less Pythian responses of even that most powerful of scientific implements, the spectro-scope, when confronted by some, and those not even the most distant, of the nebulae. . . . And yet these nebulae must be as old as Earth itself, must have undergone change after change during the countless million years that geology assigns to our own orb, and they visibly evince those changes in the multiplicity of forms, circular, elliptical, spiral, and otherwise, which they present for view to-day. Now, if their change of form be, as it is asserted to be, in the line of evolution, then there must have also been a corresponding change from the matter and force originally resident in them. So that, however simple the matter of those nebulae be even now,—so much so as to defy the prism and the lens,—there must have been a time past when it was simpler still, and an archaic day when the nebulous mass that embraced our universe, and (it may be) external universes, contained matter and force in their simplest forms. What the nature of such force could be is one of the vexed questions of to-day. It could not have been any of our known forces; not even gravitation, for in space filled with nebulous matter, the *plenum et inani* of Epicurus, there was nothing to gravitate to or to be gravitated by. Space and matter were one. What the nature of the matter was is equally incomprehensible, since it is almost as difficult to believe it gaseous as it is to believe it fluid or solid; and we know of matter under no other than these three forms. Be this as it may, *a universal nebulous mass, characterised by the extreme of simplicity as to form, matter, and force*, is the "fons et origo" of approved modern science when tracing back our universe to its cognisable beginning.

If we now turn to Mythology we find Chaos heading the list of all existences, the "first of all," the embracing all, and than which there was none older. This must consequently be the mythic synonym of our scientific fons et

origo, and if so, must be found to agree with a universal nebula having the extreme of simplicity as to matter, force, and form. So far as priority is concerned the proof is evident enough. Hesiod, invoking the Muses, writes as follows and effectually disposes, it will be observed, not only of the priority of Chaos, but also of the false notions concerning the religious views attached to the so-called Pagan deities.

Χαίρετε, τέκνα Διός, δότε δ' ἡμερόεσσαν ἀοιδήν.
κλείετε δ' ἀθανάτων ἱερὸν γένος αἰὲν ἑόντων,
οἱ γῆς ἐξεγένοντο καὶ οὐρανοῦ ἀστερόεντος,
νυκτὸς τε δυοφερῆς, οὗς θ' ἄλμυρὸς ἔτρεφε πόντος.
εἴπατε δ', ὥς ταπρῶτα θεοὶ καὶ γαῖα γένοντο,
καὶ ποταμοὶ καὶ πόντος ἀπείριτος, οἷδματι θύων,
ἄστρο τε λαμπετόωντα καὶ οὐρανὸς εὐρύς ὑπερθεν,
οἳ τ' ἐκ τῶν ἐγένοντο θεοί, δωτῆρες ἑάων,
ὥς τ' ἄφενον δάσσαντο καὶ ὥς τιμὰς διέλοντο,
ἦδὲ καὶ ὥς ταπρῶτα πολύπτυχον ἔσχον Ὀλυμπον.
ταῦτά μοι ἔσπετε Μοῦσαι Ὀλύμπια δώματ' ἔχουσαι
ἐξ ἀρχῆς, καὶ εἴπαθ' ὅ τι πρῶτον γένετ' αὐτῶν.

Ἦτοι μὲν πρότιστα Χάος γένετ'.

Theog. 104—116.

Jove's children, hail, and grant the pleasing song.
Of gods immortal voice the blessed race
Who claimed descent from earth and starry heaven,
From gloomy night, and whom the salt sea nursed.
Tell how the elements were gods and earth,
Rivers, and boundless billow-beaten sea,
The shining stars and the wide heaven above ;
And who of gods, the givers of all good,
Were from them sprung ; and how they shared the spoil,
And how the honours meted ; also how
Those elements Olympus wreathy held.
O Muses, ye that have Olympian domes,
Those things relate to me from day of eld,
And whichso of them was the first declare.
Truly, indeed, was Chaos first of all.

The possibility of producing such a nebula as has been described has occupied the attention of Science.

Helmholtz says: " If our earth were by a sudden shock brought to rest on her orbit, a quantity of heat would be generated sufficient to fuse its mass and reduce it for the most part to vapour. If, in addition, the earth having

been thus brought to rest should fall into the sun (which of course would be the case); the quantity of heat developed by the shock would be 400 times greater."

That is to say, the condition of nebulous matter would be attenuated or simplified to a degree beyond ordinary comprehension. Other writers have carried the same agent, heat, and the same *modus operandi* to systems beyond our solar one, and shown that progressive concentration or clustering of stellar bodies would of necessity lead to collisions: those collisions would generate heat so much the more intense than that produced by the earth falling into the sun, as the distance and magnitude of the colliding stellar bodies are greater than those of earth and sun: the diffused matter produced therefrom would form a resisting medium tending to diminish the velocities of other stellar bodies, and to increase the possibility of more frequent collisions with the same result: and so on, thus entailing eventually complete dissipation of matter and force and a universal nebulous condition. From all this we can infer that heat, intense heat, would be a prime factor in the causation of a more or less simple universal nebula.

Now, the same intense heat is mentioned by Hesiod as the one agent capable of producing a condition of things approximating the most nearly to Chaos. When describing the battle of Jupiter against the Titans, the poet pictures Zeus as collecting all his strength and hurling thick and fast both bolt and lightning on his foes till at last earth itself and all upon it shared in the conflagration. He then continues thus:—

ἔξεε δὲ χθὼν πᾶσα καὶ Ὠκεανοῖο ῥέεθρα,
πόντος τ' ἀτρίγετος· τοὺς δ' ἄμφεπε θερμὸς αὐτμῇ
Τιτῆνας χθονίους, φλόξ δ' ἡέρα διὰν ἴκανε
ἄσπετος, ὅσσε δ' ἄμερδε καὶ ἰφθίμων περ ἑόντων
αὐγὴ μαρμαίρουσα κεραυνοῦ τε στεροπῆς τε.
καῦμα δὲ θεσπέσιον κατέχεν Χάος· εἴσατο δ' ἅντα
ὀφθαλμοῖσιν ἰδεῖν ἢ δ' οὔασιν ὅσσαν ἀκοῦσαι
αὐτῶς, ὥς ὅτε Γαῖα καὶ Οὐρανὸς εὐρύς ὑπερθε
πίλιναιθ'. οἷος γάρ κε μέγιστος δοῦπος ὀρώροι
τῆς μὲν ἐρειπομένης, τοῦ δ' ὑψόθεν ἐξεριπόντος,
τόσσος δοῦπος ἔγεντο θεῶν ἔριδι ξυνιόντων.

Theog. 695—705.

Then steamed the all of earth, the ocean's springs,
 The boiling sea. Then circling round and round
 Those earthy Titans coursed the fiery surge;
 And flame untold to air celestial came;
 And mighty though they were, the dazzling glare
 Of bolt and lighting 'reft them of their sight.
 Then awful Chaos checked the heat intense,
 And seemed as face to face with eyes to see,
 With ears to hear a boding sound,—the same
 As when wide heaven above and earth drew nigh.
 For such a crash tremendous as arose
 From him compressing and from her compressed,
 Some such the crash was of conflicting gods.

Ovid, too, bears similar testimony. Writing of the hardihood of Phæthon in guiding the chargers of the sun, he pictures the conflagration that ensued therefrom as come to earth, destroying city and plain, mountain, river, and the depths of land and sea, till finally earth herself, compelled by dire necessity, implores relief and mercy from the intense heat, and thus winds up her prayer:—

“Si freta, si terræ periunt, si regia cœli;
 In Chaos antiquum confundimur.”

Met. II. 298—299.

If perish water, land, and sky's domain,
 To oldest Chaos are we blent again.

When we turn to the derivation of the word Chaos we find additional points of resemblance between the scientific and mythological starting points. The primal nebula was such, we are told, as would be the last recipient of matter and force if dissipated by long-continued collisions of stellar bodies in space: it was also the general receptacle from which matter and force would be evolved in the order of time. It was thus the refuge and the source, the coffin and the cradle, the goal and starting point of created being.

Now, if it be possible for a single word to picture this dual idea, then Chaos is that word. It—*χάος*—comes from an old root *χα* that has a twofold meaning, namely, *holding*, and *releasing*. The former is well seen in *χαρδάνω*, “to hold, comprise, contain”; the latter, in *χαλάω*, “to let

loose, to release." Other characteristically nebulous ideas are instanced in χαίνω and χάσκω, "to gape, open, separate"; in χάλις, "pure or unmixed wine," that is, in its *simplest* form; in χαννών, "to make light, to weaken both the force and the weight"; in χαίος, "original"; and in χαίρω, the imperative form of which, χαίρε, is used to signify both "welcome" and "farewell." So that Chaos would literally mean the Holder and Releaser, the Welcome and Farewell of all things, and would thus be the exact personification of the idea embodied in the greater nebular hypothesis of science.

For further particulars we quote Hesiod:—

- 1 Ἦτοι μὲν πρότιστα Χάος γένητ', αὐτὰρ ἔπειτα
Γαῖ' ἐρύστερνος, πάντων ἔδος ἀσφαλὲς αἰεὶ
ἀθανάτων, οἳ ἔχουσι κάρη νιφόντος Ὀλύμπου,
Ταρταρά τ' ἡρόεντα μυχῶ χθονὸς ἐρνοδείης,
 - 5 ἦδ' Ἔρος, ὃς κάλλιστος ἐν ἀθανάτοισι θεοῖσι,
λυσιμελής, πάντων τε θεῶν πάντων τ' ἀνθρώπων
δάμναται ἐν στήθεσσι νόον καὶ ἐπίφρονα βουλήν.
- Theog. 116—122.

Truly, indeed, was Chaos first of all;
But consequent therefrom, the wide-stretched Gæ,
The e'er persistent bed of all the gods
Who of Olympus snowy hold the peaks,
And nebulous depths in wide-grooved earth's recess;
And Eros too, amongst immortal gods,
Most subtle and resolving, who rules o'er
The duteous wish and feeling in the breasts
Of all, of all, both gods and men alike.

NOTES.

- 1 ἔπειτα—This word in Greek expresses the *immediate* sequence from *what goes before*, and shows that both Γαῖα and Ἔρος, Matter and Force, were inevitably blended in the chaos.
- 2 Γαῖ'—The matter of our universe, evidently disseminated (ἐρύστερνος) through the nebulous mass. It seems connected with, if not derived from, γάω, an obsolete root denoting "to be derived from, to be born," as also, "to be proud of, to exult." If we regard the γ as but an aspirate form—the digamma—we can trace the word through its other form, αἶα, to ἄω, "to sleep; to satiate; to breathe," all three meanings indicative of the *rest* and *oneness* that prevailed in the chaos when "the *Spirit* of God moved upon the face of the waters."

"By the word of the Lord were the heavens made, and all the host of them by the breath of his mouth." Psalm xxxiii. 6.
 ἔδος—Matter is persistent (ἀσφαλὲς αἰεὶ), the great foundation or *bed* of all created things, whether in air above or in the very nucleus (μυχῶ) of our globe.

- 5 "Eros—Force. The word is derived immediately from φέρω, as our "force" is from φορά, the Latin *impetus*: hence φορά πραγμάτων, "the force of circumstances," and φέρε γαρ, or φέρε alone when introductory, answering to our "for" or "perforce." In many other words, too, of similar meaning, the φ is omitted; as in φημί, ἡμί; πολλός, δαλός; φέριστος, ἄριστος, &c.

Force produces either motion or rest, motion being a change of place, and rest being the opposite of motion. As the minimum of force is accompanied inseparably by the minimum of motion, the simplest form of force and motion may be said to reside in *change*, a passing from one state to another, an alteration immeasurably great or infinitely small, as the case may be. Change implies both force and motion; its absence implies rest. Now, ἔρος curiously enough becomes by metathesis ῥέος, "flux or change," and the term οἱ ῥεόντες has been given to such philosophers as Heraclitus and his followers, who held the theory that "all things are in a constant state of flux"—a theory equivalent to our own idea that "change is persistent."

The Chaos would thus mean simplicity or Absolute Rest, in which were the substance of matter (Ge), and rudimentary force and motion, or change (eros).

- 6 λυσιμελής—From λύσις μέλω, "presiding over resolution," as seen in the law styled "the resolution of force."

Ovid, too, adds his contribution—no mean one either, for every line is brimful of information as regards the proper understanding of the Chaos:

1. Ante mare et terras, et, quod tegit omnia, cœlum,
 Unus erat toto Naturæ vultus in orbe,
 Quem dixere Chaos; rudis indigestaque moles;
 Nec quicquam nisi pondus iners, congestaque eodem
5. Non bene junctarum discordia semina rerum.
 Nullus adhuc mundo præbebat lumina Titan;
 Nec nova crescendo reparabat cornua Phoebe;
 Nec circumfuso pendebat in aëre tellus,
 Ponderibus librata suis; nec brachia longo
10. Margine terrarum porrexerat Amphitrite.
 Quàque fuit tellus, illic et pontus, et aër:
 Sic erat instabilis tellus, innabilis unda,
 Lucis egens aër; nulli sua forma manebat.

- Obstabatque aliis aliud : quia corpore in uno
 15. Frigida pugnabant calidis, humentia siccis,
 Mollia cum duris, sine pondere habentia pondus.

Met. I. 5—20.

'Fore sea and lands, and sky that covers all,
 In the whole round was Nature's aspect one ;
 'Twas Chaos called ; a mass unformed and crude ;
 Nought save a passive bulk, and packed in same
 Incongruous seeds of things but badly joined.
 As yet no Titan gave the world its rays ;
 No Phœbe by increase new horns refilled ;
 Nor hung the earth self-balanced in the air
 Poured all around ; nor o'er the margin long
 Of lands had Amphitrite stretched her arms.
 And where was dust, there moisture was and air :
 Thus wanting in stability was earth,
 In yielding way the wave, in light the air :
 Its own peculiar form for none remained.
 Each hindered each : for in the substance one
 Did cold oppose the hot, did moist the dry,
 Did soft the hard, and weight those wanting weight.

NOTES.

- 2 unus vultus—Oneness, uniformity, or complete simplicity, was the characteristic of all creation's round (in toto orbe) in the beginning.
- 3 rudis—The nebulous mass was *fresh* (rudis) from the Creator's hand, and as yet destitute of form and order (indigesta).
- 4 iners—It was *powerless for effect*, and replete (congesta) with embryonic matter and force (semina rerum) *thoroughly diffused* (non bene junctarum).
- 5 rerum—"res" has a wide meaning in Latin, seeing that it signifies "thing ; whatever one can think of, corporeal and incorporeal ; matter ; force ; the world ; the universe." Ovid must have been of the opinion that the matter and force in the Chaos were not such as we know them to-day, for he uses the words "*semina rerum*."
- 6 nullus Titan—There was as yet no nearest sun, no distant star : all was darkness.
 "And darkness was upon the face of the deep."—Gen. i. 2.
- 9 librata—Any body that is *poised evenly by its own weight* is "self-balanced."
- 11 Quæque fuit tellus—Nebulous matter is scientifically described as "a cloud of intensely-heated gas, a fire-mist ; or a cloud of intensely-heated dust, finely divided particles of solid or liquid

matter, each particle enveloped as it were with a layer of permanent gas."

13 sua forma—Again does the poet suggest the *unknowable* form of matter in the Chaos.

14 obstabat—They nullified one another, and thus kept up the Absolute Rest.

Let us say here that the *Gē* of Mythology and of Hesiod must be considered in the light of a diminishing quantity. In the Chaos it stands for Matter as opposed to Force, each unknowable as to nature. Afterwards, when separated from the Chaos, it stands for the circle of the universe as opposed to the circumferential Uranus or firmament; later on, for the nebulous mass from which our Solar System was evolved; later still, for the residual nebula from which earth and its atmosphere were derived; still later, for the globe as opposed to the gaseous envelope surrounding it; and finally, for the dry land in contradistinction to the sea. This is in consonance too with the scientific hypothesis that each successive mass, when disrupted from the parent nebula, would represent the density of that nebula and would consist of progressively heavier matter. The same interpretation of *Gē* is observable in Genesis, chap. i.

"In the beginning God made τὸν οὐρανὸν and τὴν γῆν." Now the writer defines τὸν οὐρανὸν in the 8th verse, where he says "And God called the firmament Οὐρανόν," so that we are naturally led to infer that τὴν γῆν included all creation, the firmament excepted. Again it is unreasonable to suppose that the γῆ ἀόρατος καὶ ἀκατασκεύαστος of verse 2, invested as it is with the unlimited characteristics of the "abyss" or "deep," is identical in size, form, or nature with the limited γῆ surrounded afterwards by a firmament and alluded to in verse 7, "the waters which were under the firmament," as opposed to "the waters which were above the firmament"; and in no way can we confound this last γῆ or the preceding ones with that mentioned in verse 10, "And God called the dry land γῆν; and the gathering together of the waters called he seas," where the distinction is obvious.

Turning now to that verse of Genesis which concerns most immediately the very beginning of created things, we find a condition, similar to the Chaos of the myths and to the universal nebula of science, described, emphatically and clearly enough too, taking into account the highly condensed nature of the sacred narrative :

‘Ἡ δὲ γῆ ἦν ἄορατος, καὶ ἀκατασκεύαστος· καὶ σκότος ἐπάνω τῆς ἀβύσσου· καὶ πνεῦμα Θεοῦ ἐπεφέρετο ἐπάνω τοῦ ὕδατος.—Gen. i. 2.

This ἀβύσσος, “abyss,” or “deep,” as it is generally rendered, is universally accepted as the Chaos or primal aspect of Nature. Its derivation, “the unfathomable” (α βύσσος), points to the unlimited extent of the nebulous mass, and the nebulous or *misty* characteristic of the whole is shown by the epithet τοῦ ὕδατος assigned it at the conclusion of the verse. The same τοῦ ὕδατος occurs in verses 6 and 7, when the division is made by the firmament, and when we must suppose the universe as still in a nebulous condition. Not till the 9th and 10th verses, when dry land as opposed to water comes into being, do we find a change to ὕδωρ and ὑδάτων. The distinction is well marked in verse 6, where instead of the τῶν ὑδάτων that we would naturally enough accept, the writer makes use of the singular form, even at the expense of reiteration. The verse runs thus :—

Καὶ εἶπεν ὁ Θεός, Γενηθήτω στερέωμα ἐν μέσῳ τοῦ ὕδατος· καὶ ἔστω διαχωρίζον ἀνὰ μέσον ὕδατος καὶ ὕδατος· καὶ ἐγένετο οὕτως.

In this mass, unfathomable, dark, and nebulous, was the ἡ γῆ of the Genesiac narrative, fresh (*rudis*, as Ovid calls it) from the creative act alluded to in the opening verse. If, as is certain from verses 6 and 7, it was nebulous matter *after* the firmament, what must or can we suppose it as being at a time so much anterior to this event as is measured by two of the Genesiac Days? Whether knowable or not, it was at least nebulous matter, and characterised as ἄορατος καὶ ἀκατασκεύαστος. The former of those epithets, ἄορατος, has been rendered as “void,” an inter-

pretation that, however agreeable it may be with the Vulgate, is lacking in the preciseness of the Greek. It literally means "incapable of being seen" (*α ὄρω*), and if we admit the close relation between *ὄρω*, *εἶδω*, and *οἶδα*, it would also imply "incapable of being known."

The second epithet, *ἄ κατασκέαστος*, means "shapeless," or "unformed," and hence "that which is characterised by simplicity."

Applying these meanings then to the 2nd verse, it would read thus:—

"And matter was incapable of being perceived and simple; and darkness was upon the face of the abyss."

Enough has been written, we submit, to bring conviction to the mind that the story as told by Genesis, Science, and Mythology, is identical and harmonious so far as Chaos, and what Chaos stands for, is concerned. It only remains to point out how curiously close in touch are Genesis and Mythology, as instanced by finding the mythic characters in the 2nd verse of the scriptural record, thus, *χάος*, *ἄβύσσος*; *Γαῖα*, *γῆ*; and even *Ἔρος* can be detected in the *ἐπεφέρετο* attributed to the *πνεῦμα Θεοῦ*, thus alike fastening the derivation, and tending to show that *motion* in some phase was the primal force in the opinion of the framers of Mythology. There is no other feasible conclusion left that we can see: Genesis sustains it, and Science has nothing else to offer than "change," which is but the minimum of force and motion. One other conclusion can be derived from Mythology. We look in vain to this source for the idea advanced by some scientists of our day that matter and force are identical, are but forms of one another. On the contrary, it seems positive from the distinct mention of a *γαῖα* and an *ἔρος* in the Chaos that ancient lore considered the two as entities distinct and separate.

CHAPTER III.

“*QUISQUIS FUIT ILLE DEORUM.*”

Erebus and Nox.—The condition of uniformity and simplicity was not lasting. Science, as already mentioned, has pointed out a possible means whereby such a condition might be brought about. It states in general language that change is continuous and universal, and that the processes of integration and disintegration, or evolution and dissolution, apply equally to our earth, our system, and our universe as they do to organised beings on our globe.

Evolution is a change from the simple or general to the complex or special, and is constructive in its nature. Dissolution is the reverse of this.

The constructive change in the arrangement of parts, which constitutes evolution, must necessarily involve not alone the matter that makes up the parts thus re-arranged, but also the motion exhibited during the re-arrangement and the force that produces this motion. But since motion is ever carried on at the expense of deduction, and force at the expense of dissipation, evolution cannot cease, owing to the persistency of force, till a point or stage is arrived at when the forces which favour evolution are counterbalanced by the forces which oppose it. When this point, the equilibrium mobile, as it is called, is reached, change still goes on, but a reverse one, owing to the disintegrating forces being now in the ascendant. The change is now from the complex to the simple, from the special to the general, from the many to the one: it is destructive, and does not cease till a point or stage is reached when complete equilibrium, absolute rest, or the

uniform simplicity of a nebulous mass occurs. This reversed change is called Disintegration or Dissolution.

Such is the destiny that the philosophy of to-day, reasoning from the more or less probable data of collision, gradual cooling, tidal and ethereal friction, shrinkage, &c. predicts for organised existence in general and, inevitably though slowly, for the universe as a whole. It is a gloomy one enough, and must be borne in mind by those who condemn the ancients for entertaining the melancholy and grim ideas they did with regard to *Mæra* and the *Mæra*, their personifications of Destiny and the Fates.

Turning from the what-may-be to the what-was, we find as the starting point of existence a vast mass made up of diffused matter and force reduced to the extreme of simplicity. Now, change, to occur, could only transpire by altering this simplicity, by summoning from the uniform the two principles of Evolution and Dissolution, twin congeners, inseparably united, and the last—if older creations there had been—to lay down their arms—Dissolution the last of all.

This is the evolutionary theory, and "*mutatis nominibus*," it is the mythological theory also, since from the nebulous mass or Chaos were born Nox and Erebus,—Nox or Dissolution, the most ancient of the deities, the subduer of gods and men; the one of whom Zeus (Life) himself stands in awe, as well he may; Nox or Dissolution, sister and mate to, and sprung from the same source as Evolution or Erebus, from whom came *Æther* and *Hemera*, the archetypes of all that followed.

Νύξ may be derived from *νύ* or *νύν*, a particle that has reference to time past, present, or to come, and thus pointing out Dissolution as the beginning, middle, and end of all things; or from *νύσσα*, "the starting point, and the turning point" in the course of creation; or simply and perferably from *λύω*, "to dissolve, to break up," *ν* and *λ* being interchangeable in Greek.

As with Nox, so too have we a choice of words regarding the derivation of Erebus (*Ἔρεβος*): they may differ more

or less, but they all point to the idea contained in Evolution. Thus *ἔπος βαινω* "the march of force"; *φέρω βία* or *φέρω βίος*, "force-bearing," or "bearing the way of life"; *ῥέπω*, "to be ever shifting, to change."

There is another derivation suggested by Ovid in the line:

Hanc Deus et melior litem Natura diremit.

Met. I. 21.

The word "Nature" has been defined in eight or nine different ways, but they can all be covered by the one, namely, "the course of being": this too agrees closest with the probable derivation, *naturus*; the *future* participle of *nascor*. But since the course of being tends to either motion or rest, Ovid says in substance "this chaos, or Absolute Rest, was put an end to by some deity, even a *better* course of being." He thus refers to that phase of Nature which is called by Aristotle *active* as opposed to *passive*,—that is, motion as opposed to rest, or Evolution as opposed to Dissolution. The *melior natura* of the poet would thus be the equivalent of the Greek *ἀρείων βίος*, or *Ἐρεβος*, "a *better* course of Being," or Evolution. We have further confirmation in the fact that Ovid, having described the general outline of the accomplished work in two lines, summarises the whole in one expressive word:

Nam cœlo terras, et terris abscidit undas;
Et liquidum spisso secrevit ab aëre cœlum.
Quæ postquam *evoluit*.

Met. I. 22.

It may be objected that the same term Erebus was given to a portion of the Greek Hades. But in this we but see confirmatory evidence of the "evolution" interpretation. Beyond Erebus was Tartarus, the domain of fire and flame and igneous vapour, believed by the ancients to consist of molten matter, an idea entertained by most modern writers when treating of the probable nature of the interior of our globe. Exterior to this Tartarus and beyond the Styx was Erebus. If, as is generally supposed, our earth is growing cooler and more solid towards the centre, it would be

in this midway region or Erebus, that is neither solid crust nor molten interior, that *evolution* of matter would be going on, if at all.

It would seem at first sight as if there were no exact equivalents in the Genesiac narrative for Erebus. But there is really much suggestive of it. The work of each Day concludes with the phrase “καὶ ἐγένετο ἑσπέρα, καὶ ἐγένετο πρωΐ,” “And there was evening and there was morning.” If each Day was made up of an evening and a morning, and represents, as it is generally supposed to do, a long continued period of time, then “the evening and morning” would stand for successive centuries during which the forces of disintegration and of integration would preponderate in turn. In other words, each Day would consist of an evening that witnessed the decline of force and its disintegrating consequences, and of a morning that beamed on the progress of force. And when we study the words, we find that ἑσπέρα can signify “the consequences of force” (ἔσπομαι ἔρος), and πρωΐ “the march of force, or progress” (προΐημι). They both constitute “the Day” or ἡμέρα, and Hemera in mythology is the child of Erebus and Nox.

CHAPTER IV.

“LET THERE BE LIGHT.”

Æther and Hemera.—With respect to the nature of light there are two theories, the Corpuscular or Emissive, and the Undulatory or Wave. The former teaches that light consists of very minute material particles or corpuscles thrown off with immense velocities and in all directions from luminous sources. The latter considers light as the effect of an undulation or vibration produced by luminous bodies in an exceedingly rare, elastic, and imponderable medium called *Æther*, that is diffused through space. While each of these theories has its advocates, and while each admits of no actual demonstration or proof, the Undulatory is found more consistent with the phenomena produced and is the one generally adopted to-day. Neither theory supposes the existence of a vacuum, since the Emissive fills space with the matter itself of light, and the Undulatory with the all penetrating *Æther*. Youman puts the matter thus: “Now the radiant forces are believed to be all propagated by undulatory motions; but motions in what? Sound has its medium—the air; and the sound rays cannot cross a vacuum, as there is nothing to convey them. But heat, light, and the chemical force dart through the most perfect vacuum we can produce, and traverse in all directions the interstellar spaces. There must be something throughout these spaces to transmit the motion. The Wave theory of light assumes the existence of a universal *Æther*—an infinitely rare and elastic medium which is diffused through Nature, pervading even the most solid bodies. It connects atom with atom and star with star. Through this universal medium—the dynamic bond of nature—waves are sent with a velocity far exceeding

those of sound. It is objected to this idea of Ether that it is a pure creation of fancy, like caloric and phlogiston. It is urged that as we know the forces only as manifested in matter, and as a perfect vacuum has never been produced, it is better to assume that some form of *actual matter* is universal, and that the wave motions take place in *that*. But it is after all very much a question of terms. Both views assume a universal medium capable of transmitting undulatory motions ; one calls it *material*, and the other *ethereal*. Ether is not held to be *force*, but only the medium for representing those motions by which force is transmitted. One Ether suffices for all the forces, and thus by introducing the idea of *unity* in their modes of action we are prepared to comprehend their mutual relations."

There can be no hesitation in taking the *Æther* of mythology for the ether of our own day. Science has accepted the very name, one of the few not destined to die throughout the ages. The word *αἰθήρ* shows by its derivation—*αἶθω* "to light up, to keep burning"—the intimate relation between light and heat, and *αἰθύσσω*, "to put in rapid motion," is significative of the connection between both and motion.

Everywhere throughout the classics do we note the same uncertainty we have ourselves regarding the absolute proof of *Æther* as a material and as an ethereal medium. We give some examples :

Largior hic campos æther et lumine vestit
Purpureo : solemque suum, sua sidera norunt.

Æn. VI. 640.

Purior æther
Fulsit, et a toto pectore cessit onus.

Ars Amor. III. 55.

Ovid, when describing Phæthon as starting on his journey to the sun, makes use of a phrase that brings vividly to the mind the objection, "a pure reation of fancy," cited by Youman :—

Emicat extemplo lætus post talia matris
Dicta suæ Phæthon, et concipit æthera mente.

Met. I. 776.

Here is a passage that can be translated in conformity with the Undulatory theory by rendering "aquæ tremulum" as "undulating":—

Sicut aquæ tremulum labris ubi lumen aënis,
Sole repperit, aut radiantis imagine Lunæ,
Omnia pervolat late loca. Æn. VIII. 22.

Here is another from Ovid strongly pointing to the Corpuscular:—

Sed timuit, ne forte sacer tot ab ignibus æther
Conciperet flammæ. Met. 254.

But feared lest hap the ether pure derived
From many igneous fonts should take the flames.

But that Æther stands, mediately or immediately, for light is everywhere clear. As the nature of a word is best recognised by the phrases and epithets used in connection with it, we give an itemised *résumé* of the scientific Ether, annexing after each characteristic the corresponding phrase or epithet as found applied to Æther in the classics.

It is an exceedingly rare and imponderable medium :

Hæc super imposuit liquidum et gravitate carentem
Æthera, nec quicquam terrenæ fæcis habentem. Met. 67.

It is elastic (*revolubilis*), the source of light (*lucidus*, *candens*), and acts with incredible velocity (*rapidus*); it is universal as to space (*vastus*, *arduus*, *altus*), binds star to star (*signifer*), is the "dynamic bond of nature" (*sacer*, *omnipotens*), and produces a variety of effects, light, heat, colour, &c. (*pictus*, *igneus*, *cœruleus*, *purpureus*, &c.).

Whether light be the material offshoots of, or the medium thrown into vibration by some luminous body or bodies, the question arises as to the origin and location of the source or sources. The only scientific datum properly granted is a Universal Nebula, the embodiment of that complete equilibrium or Absolute Rest which philosophy points to as the goal and start. To effect anything this state of rest must be disturbed.

If we can only cause change or active effect of any kind in the mass, all else is comparatively easy ; for force accompanies and is the result of change. Science has searched for this primal cause : it is still searching. Until it has solved the problem it is compelled, even though conflicting with the strict idea of Absolute Rest, to grant a state of incessant movement to ultimate atoms. With this added condition the problem becomes solvable, and is in reality that which Plato proposed, namely, “a rude indigested mass of matter animated by an irregular principle of motion.”

If Absolute Rest be the end of all things, then motion for the mass must naturally be conceived as *the last* weapon employed by Force ere Force itself sank to Rest : if Absolute Rest be the beginning of all things, then this last of weapons dropped would be *the first* to be taken up and employed. If the end of the predominantly destructive be the beginning of the predominantly constructive, then motion would be given to the mass, and according to the correlation of forces motion can be converted into light, heat, magnetism, electricity, and chemical affinity—if, indeed, we do not go further and agree with Grove in thinking all these but modes of motion.

Would this force of motion accomplish any other result besides the generation of light, heat, &c.? Our universe, vast as it is, must be conceived as having been but a portion, a small portion, of the chaotic nebula ; and though all that the most powerful telescope observes as yet is claimed by astronomical science for our universe's domain, the same science argues for and admits the existence of what it calls “external universes.” In conformity with the doctrine of Evolution, all these must have been *one* originally : in conformity with the same Evolution they must have been separated some time. Our universe is a visible proof that they were.

The Chaotic Nebula may, on an infinitely vaster scale, be likened to our Solar System when it too was a homogeneous mass, and the same Nebular Hypothesis may be applied to

one as to the other. It would thus be presented as a luminous mass in which condensation as to substance, differentiation as to space, and a rotatory motion of the whole would occur, with the final result of *division into Universes*, and the establishment of material sources of light or of an ethereal medium for transmitting light.

Conjectural as all this must necessarily be on the part of modern science, it receives confirmation from Mythology. "Granted," says one, "a universal homogeneous nebula and rudimentary motion; then light and division into universes will follow." "Granted," says Mythology, "a Chaos and an Erebus; then Æther and Hemera will follow." The data in each case are the same: light and Æther have been shown to be synonymous. What does Hemera then represent? It, *ἡμέρα*, is derivable from *μείρομαι*, "to receive one's due, to obtain by lot, to be divided from;" so that it is very probably but *ἡ μέρα*, "the division," the first of all divisions, the division *par excellence*; that is, the division into universes,—thus bearing testimony to the truth of modern philosophical conjecture.

From being a division of the unknowable in space, matter, and quantity, it was transferred to our universe, our System, and our Earth, and made to denote a division of time, or a "day," the length of which would mark the return of certain phenomena in the same order, and bring back, as it were, the end to the beginning. It would thus signify an ordinary day of 24 hours, marked by the regular succession of day and night; or a Lunar Cycle of 19 years, after the lapse of which the phases of the moon would occur on the same day of the year; or a Solar Cycle of 28 years, after the termination of which the days of the month return to the same days of the week; or the Platonic year, our own Precession of the Equinoxes, a period of about 25,868 years, at the end of which the stars and constellations return to their former places in respect to the Equinoxes.

The Romans, who kept such names as Chaos, Erebus,

Nox, and Æther, substituted Dies for the Greek *ἡμέρα*. If we derive it from *δία*, “passing right through and going out of” as to space, and “throughout, or during,” that is, extension as to time, we can see in *dies*, as in *ἡμέρα*, the same division as to universes, and the same measurement as to that duration of which each heavenly body, our universe and external ones are, after all, but the great timekeepers.

Nor is the idea of “heavens of heavens,” or external universes confined to the very ancient or very modern times. Everywhere through mediæval literature do we find allusion made to them, to a heaven for our system, a *cælum stellatum* for our universe, to a crystalline heaven, a *primum mobile*, and above all those mobile heavens to a *supremum cælum immobile* or *Empyrean*.

Turning now to Genesis, we find the self-same story told, and some of the missing links supplied :—

- 2 Ἡ δὲ γῆ ἦν ἀόρατος, καὶ ἀκατασκεύαστος· καὶ σκότος ἐπάνω τῆς ἀβύσσου· καὶ πνεῦμα Θεοῦ ἐπεφέτω ἐπάνω τοῦ ὕδατος.

The writer, it is seen, presents but *one* condition, the ideal one of science, Absolute Rest, or “matter incapable of being perceived, and simple.” He solves the problem of creation by alluding to *motion* as the force brought first into action, and “the Spirit of God” as the First Cause in changing the passivity to activity.

The results that followed are in harmony with the deductions of Science and Mythology :—

- 3 Καὶ εἶπεν ὁ Θεὸς, Γενηθήτω φῶς· καὶ ἐγένετο φῶς.
 4 Καὶ εἶδεν ὁ Θεὸς τὸ φῶς, ὅτι καλόν· καὶ διεχώρισεν ὁ Θεὸς ἀνὰ μέσον τοῦ φωτός, καὶ ἀνὰ μέσον τοῦ σκότους.
 5 Καὶ ἐκάλεσεν ὁ Θεὸς τὸ φῶς, Ἡμέραν, καὶ τὸ σκότος ἐκάλεσε, Νύκτα· καὶ ἐγένετο ἑσπέρα, καὶ ἐγένετο πρωΐ, ἡμέρα μία.

Here we find *φῶς* and *Ἡμέρα* as the representatives of Æther and Hemera, of light and division of the chaotic nebula. That the Genesiac Hemera of the First Day has reference to external universes may be understood by reasoning in the same manner as before. It is rationally

absurd to suppose it as a day measured by the revolution of a universe, much less of an earth, that was still in the bosom of the abyss. There was (and still is) a Seventh Day peculiarly for our earth, and a Sixth, a Fifth, and a Fourth (tacitly implied), and a Third when the fiat for its separate existence went forth thus: "Let the waters under the heaven be gathered together unto one place, and let the dry land appear." There was a Second Day when God said, "Let there be a firmament in the midst of the waters, and let it divide the waters from the waters. And God made the firmament and divided the waters which were under the firmament from the waters which were above the firmament."

Was this Second Day for Earth? or for the Sun, Moon, and Stars? They were not in existence, save in as much as they formed one mass, "the waters which were under the firmament." This Second Day was consequently for our universe as an independent whole.

But there was a Day preceding all these, when the waters above and the waters under were *one*, when our universe was *but part* of that vast world of waters upon the face of which moved the Spirit of God, and with regard to which God said, "Let there be light." What then of those waters that were *above*, when the division by a firmament was accomplished? They too were as *material*, however unknowably so, as the waters under the firmament; they, too, *enjoyed the light* that was made. They, too, must have shared in the benevolence of creation and of evolution, and we see no other way that they could do so unless as an external universe or as universes. Neither do we see any other Genesiac Day during which the division was likely to be accomplished, if not that which the writer of Genesis has distinctly and notably avoided calling "first." We see every reason, then, for taking the concluding words of verse 5 literally,—*ἡμέρα μία*, "one day," *the one day* of all others that witnessed the Oneness of Being, that witnessed the Darkness o'er one and all, the Light which still lasteth for one and all, and the division of the Oneness.

If there be a day measured by hours for Earth, by years for our System, by hundreds of centuries for our Universe, what is the measure of the Day for the most external of external universes? And if day and night be fateful phenomena for Earth, menstrual and hebdomadal days for our System, and the stars and constellations for our Universe, what must be the phenomena for the most external of universes, the orderly return of which will bring back the end to the beginning?

There is no answer, not even from the higher mathematics, to the first question; but the reply to the second is forced, absolutely forced upon us by the same ratio-cination that has told what the beginning of all things was,—Absolute Rest. And if so, this *ἡμέρα μία* is the *one day to come*, foretold alike by Genesis, Mythology, and Science, when the axles of our Earth, our System, our own and other universes will grow tired and worn out; when the worlds will rush from their allotted spheres and be dissipated by collision into a condition similar in all respects to the “matter incapable of being perceived, and simple” of Genesis, to the Chaos of Mythology, to the Absolute Rest of Science. Then will the long, long round of this “One Day” be circled; then will the end be brought back to the beginning; then will matter and force be one and simple, meet for the God, One and Simple, who created it so; then surely, unless Science, Writ and Myth be all three false, will the words from the Sermon on the Mount be verified to completion, “Thy Kingdom come!”

Hesiod disposes of the general separation in a few lines:

ἐκ Χάος δ' Ἐρεβός τε μέλαινα τε Νύξ ἐγένοντο
 Νυκτὸς δ' αὖτ' Αἰθήρ, τε καὶ Ἡμέρη ἐξεγένοντο,
 οὓς τέκε κυσαμένη, Ἐρέβει φιλότῃτι μίγξισα.

Theog. 123—5.

From Chaos came dark Nox and Erebus;
 From Nox was Æther sprung and Hemera,
 Whom she that big with them had grown brought forth,
 Mixed in affinity with Erebus.

He reserves details of the general for the particular separation of our own firmament, showing that the same cause or causes operated in one as in the other.

Ovid, on the contrary, writes at large of the general separation, and lets the reader understand that from one event he may learn whatever other followed with regard to our universe, and later on to our System and our Earth :

- 1 Hanc Deus et melior litem Natura diremit :
Nam cœlo terras, et terris abscidit undas ;
Et liquidum spisso secrevit ab aëre cœlum.
Quæ postquam evoluit, cæcoque exemit acervo,
- 5 Dissociata locis concordî pace ligavit.
Ignea convexi vis et sinè pondere cœli
Emicuit, summâque locum sibi legit in arce.
Proximus est aër illi levitate, locoque :
Densior his tellus, elementaque grandia traxit,
- 10 Et pressa est gravitate sui. Circumfluit humor
Ultima possedit, solidumque coërcuit orbem.

Met. 21—31.

This liss some god, a better Nature, broke :
For by a firmament the worlds, and by
Those worlds the waters separated he ;
And from the darkness rent the liquid vault.
Which once evolved and freed from the Unseen,
Apart in place he bound in concord's peace.
The fiery and imponderable strength
Of heaven's convexity flashed forth and chose
Its own location in the furthest court.
In place and lightness next to it is air :
To those the denser earth, and did attract
The glorious elements and down was pressed
By weight its own. The vapour wide-diffused
Grasped the extremes and bound the concrete orb.

NOTES.

- 1 Deus.—“Some god,” for in line 32, Ovid says “*quisquis fuit ille Deorum.*” The *et* is definitive, and shows that the god was “a better course of being,” that is Erebus or Evolution.
litem.—*Et nova fictaque nuper habebunt verba fidem, si Græco fonte cadent, parce detorta.*

Hor. Ars Poet.

Ovid makes use of a Greek word *λίρος* “simple,” *slightly twisted* into a Latin form in order to describe the absolute rest or *simplicity* of the Chaos. This signification pervades the Latin *litera*, our own *letter*, the first or simplest element of written

language. We find it also in *litany*, the simplest form of supplication to God ; and in the word we have used, *liss*, which, though now obsolete, is used by Chaucer to imply "a freedom from care, grief, pain, strife, &c."

- 2 *Nam coelo*.—This line and the next describe briefly and tersely the work of the First Genesiac Day. He tells how the division was made (1) into worlds or universes separated as one mass from the Chaos and illumined by light. "And God divided the light from the darkness."

(2) Those worlds would then, as a distinct mass, be a separation between the nebulous matter or waters of which they themselves were composed, and the nebulous matter or waters that lay beyond the light.

- 4 *evolvit*.—A significative word as applied to Erebus or Evolution. *cæco acervo*.—The chaos, the $\eta\gamma\eta$ *ἀόρατος* of Genesis, the unknowable and *unseen* matter of creation.

The matter illumined by the light had evolved and assumed some *visible* form that distinguished it from the *invisible* matter of the Chaos.

- 5 *dissociata*.—The worlds or universes, while separate from each other, were united by accordance. Concord precedes harmony.
- 6 *igneæ vis*.—Light and heat accompanied the division, and proceeded from the furthest ends of the division, from the highest heaven.
- 9 *his tellus*.—*Next* to the light and air; *proximus* is understood from the preceding line. The gradual settling and arrangement of the mass is now described, of matter into its three forms, solid, liquid, and gaseous.
- 10 *humor*.—The watery or aqueous vapour was mingled and diffused more or less with the solids and gases from surface to centre (*ultima*). Every form of matter contains water.

We conclude with the following lines from Milton's *Paradise Lost*. Uriel speaks thus to Satan :

" I saw when at His word the formless mass,
This world's material mould, came to a heap :
Confusion heard His voice and wild uproar
Stood ruled, stood vast infinitude confined ;
Till at His second bidding darkness fled,
Light shone, and order from disorder sprung.
Swift to their several quarters hasted then
The cumbrous elements, earth, flood, air, fire ;
And this ethereal quintessence of heaven
Flew upward, spirited with various forms,
That rolled orbicular, and turned to stars
Numberless, as thou seest, and how they move ;
Each had his place appointed, each his course ;
The rest in circuit walls this universe."

BOOK SECOND.

THE ONENESS OF OUR UNIVERSE.

CHAPTER I.

THEOGONY.

GÆA			GÆA		
			URANUS,	OUREA,	PONTUS
TITANS,	CYCLOPES,	HECATONCHEIRES			
viz.	viz.	viz.			
Oceanus	Brontes	Cottus			
Cæus	Steropes	Briareus			
Crius	Arges	Gyes			
Hyperion					
Iapetus					
Thea					
Rhea					
Themis					
Mnemosyne					
Phœbe					
Tethys					
Kronos					

MYTHS.

Gæa—or *Ge*, the Latin *Tellus*, is described as resident in the *Chaos*, and as having produced *Uranus* first, and then the *Ourea* and *Pontus*. By *Uranus* she begot the *Titans*, *Cyclopes*, and *Hecatoncheires*, the last of which were called *Centimani* by the Romans. As the personification of *Earth*, *Ge* was regarded as one of the deities of the nether world, to whom cows and black sheep were sacrificed, and who was evoked by persons taking oaths. Her worship was universal, and her temples and altars numerous.

Titans—twelve children begotten by *Uranus* and *Ge*, six sons and six

daughters, namely, Oceanus, Cæus, Crius, Hyperion, Iapetus, and Kronos; Thea, Rhea, Themis, Mnemosyne, Phoebe, and Tethys.

Apollodorus adds an additional daughter, Dione. Of those Titans, Oceanus was esteemed the eldest, and Kronos the youngest.

Cyclopes—children of Uranus and Ge, three in number, namely, Brontes, Steropes, and Arges, each of whom had but one eye in the middle of his forehead. They were imprisoned by Uranus and delivered by Kronos who again thrust them into Tartarus, from which they were finally released by Zeus in his war against the Titans. They it was who fashioned the thunder, the bolt, and the lightning for Zeus, the helmet for Pluto, and the trident for Neptune. Later myths make them assistants of Vulcan, many in number, and volcanoes the workshops where they forged metal armour and ornaments for the gods. The strongest and most impregnable natural fortresses are said to be their works. Homer and other poets, Greek and Latin, speak of the Cyclopes as a gigantic and lawless race dwelling in Sicily, and having but one eye in their forehead, as caring naught for Zeus, and as devourers of human flesh.

Hecatoncheires—"the hundred-handed," were three other children of Uranus and Ge, namely, Cottus, Briareus, and Gyes. They are described as beings of extraordinary size and strength, with fifty heads and a hundred hands. They underwent the same fortunes at the hands of Uranus and Kronos as did the Cyclopes, but were finally released by Zeus when he freed the Cyclopes, and assisted him in the Titanomachia. Of these Briareus, so called by the gods, but styled *Ægeon* by men, was united to Cymopoleia, the daughter of Neptune.

Uranus—son of Gæa and afterwards united to her. Through dislike of his children, the Cyclopes and Hecatoncheires, he bound and thrust them, as soon as each was born, into Tartarus. Ge, their mother, indignant at such treatment, manufactured an adamantine sickle, took counsel with her other children, the Titans, and succeeded in gaining them over to her side. Placing Kronos, her youngest born and the one who had first volunteered his services, in ambush, she gave him the sickle and instructed him how to use it. This he did, unmanned his father Uranus, and flung the several parts into the sea. From the drops of blood that fell on Ge, while this was being done, were afterwards sprung the Erinyes, the Giants, and the Melian Nymphs; and from the foam that gathered round the severed parts floating in the sea was sprung Aphrodite or Venus.

CHAPTER II.

“WITHOUT FORM AND VOID.”

Gæa.—The myth from Chaos to Æther and Hemera is, as we have seen, descriptive of the theory which the ancients held regarding the gradual evolution of primordial matter from a state of Absolute Rest or Total Uniformity to separate masses, the pre-eminent characteristic of which was luminosity. What further follows has to deal with what we call the collective Universe, the Greeks τὸ πᾶν, “the all,” and the Latins *mundus*, “the one course” (μόνος ὁδός)—a derivation confirmed by the other meaning, “provision of any kind,” assigned to *mundus* and ὀδαῖος (from ὁδός).

It commences with a time when our heaven and our earth were one. In this period *Gē* is no longer to be considered as the *passive* *Gē* that rested in the Chaos. She is rather an *active* agent that begets a Uranus and by him the Titans, Cyclops, and Hecatoncheires; a mass that shrinks with pain at the maltreatment of her offspring and that plans for their deliverance from the depths. No longer does she bear the distinctive title of Γαῖ' ἐρύστερνος that characterised her in the Chaos: she bears another title now, and for the first time, that of Γαῖα πελώρη. It is still nebulous matter that we have to deal with at the start, matter that is simple, shapeless, and unknowable. It is so far a chip of the old block, but it differs from the Chaos in being a discrete mass, and endowed with luminosity and motion of some kind. It is our Universe as we may imagine it when first separated from the chaotic mass, when earth and system and every stellar body in the heaven were all one nebulous whole.

Astronomy tells the story thus.

Our universe is composed of clusters of worlds separated from each other by vast intervals of space. Each mos

faint and distant of the nebulae constitutes a cluster. Our own system and all the stars observable by naked eye or most powerful telescope belong to another cluster or nebula called the Galaxy or Milky Way; and the probable conjecture is that this same Galaxy originally embraced not only our cluster but all the others as well. "The vast siderial system," says Gore, "in which our Solar system is situated includes, in all likelihood, the whole of the stars and nebulae visible in our largest telescopes." To the unaided eye the Galaxy looks like a broad whitish band arching the heavens from horizon to horizon, and maintaining the same position relatively to the stars. Under the telescope it is resolvable into millions of stars and star dust, is lenticular as to form, and bifurcated at one extremity, our place in the system being supposed to be close to the point of bifurcation.

That the ancients conceived much the same idea with regard to the Galaxy as we do ourselves is evidenced by the name given to it by them. Galaxy denotes "the milky worth" (*γάλα ἄξια*), or that quality which is most characteristic of the thing; and *γάλα* with the Greeks, as *lac* with the Latins, is often used to denote the elementary nature or first principles of a thing,—in this case, the nebulous nature of the mass. It must have been this erstwhile Gæa that Anaximander and Anaxagoras had in mind when they compared Earth to a cylinder, at one end of which was situated the known surface of land and water. Aristotle called it the splendour of innumerable distant stars. Ovid thus describes its appearance, lustre, and shape; says that the stars have their orbits in it, and even points out the very location in it of our solar system :

- 1 Est via sublimis, cœlo manifesta sereno,
Lactea nomen habet; candore notabilis ipso.
Hâc iter est Superis ad magni tecta Tonantis,
Regalemque domum. Dextrâ lævâque Deorum
- 5 Atria nobilium valvis celebrantur apertis.
Plebs habitant diversa locis. A fronte potentes
Cœlicolæ, clarique suos posuere penates.
Hic locus est, quem, si verbis audacia detur,
Haud timeam magni dixisse Palatia cœli.

Aloft there is a Way, in clear sky plain,
 Called Milky, famed for lustre of its own.
 Here is the path for luminaries bright
 Close to great Jove, his belts and royal house.
 On right and left the courts of noble gods
 With gates thrown ope are far and wide renowned :
 The lesser sundry in their places dwell.
 Celestials bright and potent have in front
 Their own peculiar habitations fixed :
 Here is the spot I'd fear not to have called,
 If license be permitted to my words,
 The mighty Empyrean's masterpiece.

NOTES.

- 3 Superis.—The planet Jupiter is attended by four satellites, all but one exceeding our own Moon in size. They are said to have been discovered by Galileo. But as both belts (*tecta*) and satellites can be seen with telescopes of very moderate power it is more than likely that they were known to the ancients, and the line in Ovid is almost positive of the supposition being true.
 Magni Tonantis—Jupiter, which we often call “the *giant* planet.”
- 4 regalem domum—So, in astrological language, we speak of the “house” of Jupiter, of Mars, &c.
 nobilium deorum—So Byron.
 “Ye multiplying masses of increased
 And still increasing lights! What are ye?
 * * * * *
 O God! O Gods! or whatsoe'er ye are,
 How beautiful ye are!”
- 5 atria—The constellations, the “courts” of heaven.
 valvis apertis—The shape of the Milky Way is roughly thus —<
 The poet alludes to the curious valvular openings, and to the fact that many of the brightest stars (*nobilium deorum*) have their location on either side of the bifurcation.
- 6 plebs—Galactean photographs tend to show that the small stars of which the Milky Way is principally composed, are probably really as well as apparently *small*.
- 7 Cœlicolæ—He now alludes to the particular bodies that compose our Solar System, *bright* to the eye and *potent* on each other through attraction, and points out the angle, the front (a fronte) of the bifurcation, where our System is placed in the galaxy.
- 8 Hic locus—Our own Earth amid the “Cœlicolæ,” Earth that is the “masterpiece of creation.”

It is presumably then this Galactean nebula that, fresh from the Chaos, presents itself for consideration as the Universe in its infancy. Let us again reiterate its characteristics in those early days. It was homogeneous,

unformed, indefinite as to extent, and possessed of matter and force that were unknowable: it was richer by the dowry of luminosity and motion. How would such a mass behave at the start?

- 1 Γαῖα δέ τοι πρῶτον μὲν ἐγένετο ἴσον ἑαυτῇ
Οὐρανὸν ἀστερόενθ', ἵνα μιν περὶ πάντα καλύπτῃ,
ὅρρ' εἴη μακάρεσσι θεοῖς ἔδος ἀσφαλὲς αἰεὶ·
γένετο δ' Οὖρεα μακρά, θεῶν χαρίεντας ἐναύλους,
- 5 Νυμφέων, αἱ ναίουσιν ἀν' οὖρεα βησσηέντα.

Theog. 126—130.

And firstly then did Gē indeed produce
Like to herself the starry Uranus,
To wrap her all around, that she might be
An e'er persistent bed for blessed gods:
And Ouria far-stretching she produced,
The charming halls of deities, the Nymphs
Who occupy those transcendental courts.

NOTES.

- 1 ἴσον ἑαυτῇ—The nebulous Gē produced the firmament (Οὐρανός) like to herself. It might be done by a further expansion of its own matter, caused by the heat involved in the process of separation from the Chaos. When matter is heated, the vibration of its particles is augmented; they move more freely, are urged apart, and thus produce expansion. This expansion involves form, as seen in the change of solid ice to liquid water, and of this water to steam. *Similar* figures (ἴσον) differ in magnitude, not in composition.
- 2 καλύπτῃ—to envelop her, to give her *form*—orbicular form.
- 4 Οὖρεα μακρά—to οὖρος or ὄρος means “a mountain, a chain of hills,” literally, “a something rising,” to define and limit. Hence οὖρος or ὄρος, “a boundary, limit, space between objects.” The poet alludes not only to the *interstices* (larger than the atoms themselves, *i.e.*, μακρά), between the ultimate atoms, but to the universal *porosity* of matter. Curious instances of such have been observed in the openings known as the “fish mouth” in the nebula of Orion, the “key-hole” in Argo, the “coal sacks” of many of the large irregular nebulae, and the dark rifts or tunnels noticed in Andromeda. Gore, speaking of them, says, “We must suppose these vacuities to represent tunnels through a gaseous mass * * * or perforations * * *. In either case, it is not easy to understand how an opening through a gaseous mass can be kept open, and prevented from closing up by fluid pressure.”
- ἐναύλους—an expressive word, “hollows,” applied to the *pores* of matter.
- 5 ἀν' βησσηέντα—ἀναβαίνω, “to exceed, to go beyond.”

Such is the Hesiodic narrative. Apparently simple as the lines read, they would seem to be the reiteration of all that was contended and fought for over and over again in the old philosophies,—being and not-being, the becoming, the one going into the many, the love principle of Parmenides, the strife principle of Heraclitus, the love and strife combined of Empedocles, the fulness and void, and so on,—all in the endeavour to account for the passing of possible being into actual matter. If so, we must understand the production of Uranus and the Ourea as the first efforts of matter in changing from the unknowable to the knowable, and may reason briefly thus.

We can change ice to water, and this water to vapour. In each of the three stages the matter is still present, one and unalterable—imperishable, as we say. Has the form perished? It would seem not, inasmuch as we can bring it back by changing the vapour to water and this to ice. But it has certainly changed. And that we cannot in *all* cases bring back the form, as in the case of decomposed organisms, is no valid objection; it is only to confess our inability to do in some instances what we can do in others. Form, as we know it, clings to and changes with matter as we know it, that is, to matter invested with its properties. A writer states the question briefly enough thus:—

“Matter, or that which composes all bodies, has certain *properties*; by which is meant that it has the power of making certain impressions upon our senses, or of exciting in us *sensations*. Through these sensations we are said to have a *perception* of matter and bodies; but as for what matter is in itself, beyond its power of affecting our senses, we know nothing. The something, whatever it is, in which this power is conceived to reside, is called *substance*. Some philosophers deny the existence of anything beyond the properties; but though we have no direct evidence of anything else, it is difficult, if not impossible, to get rid of the notion that there is a substance in which the properties inhere.”

Again, as in the ordinary course of nature we must conceive matter as the basis of form, as a something knowable, without which knowable form cannot be, so too

must we conceive the substance of matter as a something unknowable, without which unknowable form cannot be, and therefore as a something *precedent to form*.

There is much, therefore, pointing to the conclusion that it is this Substance, or matter without its properties, that Mythology has personified by the Gæa of our universe. The Gæa of the Chaos would be a Gæa over which, according to Genesis, the *σκότος* was; and *σκότος*, if it be susceptible of derivation, would be *σκιὰ ὅτις*, "the shadow of substance." The Gæa of the Universe would be substance from which this darkness was removed by the production of an Æther and a Hemera, of light and translation from the Chaos. The idea of evolution would thus be rigidly preserved, though we are scientifically at a loss as to how it was carried out. The same evolution would continue only by making this substance assume form; and this, too, agrees with the myth when it says that Gæa was first, and that she subsequently begot Uranus, with whom she was then united, and by whom she afterwards begot the Titans, Cyclopes, and Hecatoncheires. So that in general Uranus may be regarded as the junction between the potentiality and the actuality of matter. Matter would thus take the first step to pass from the indeterminate to the determinate—that is, to *atomic matter*. But atomic matter implies *porosity*, since atoms, to be indivisible and impenetrable, must be *limited and separated from each other*. The atoms of matter are never in actual contact, it is said; and the intervals between them are thought to be far greater than their diameters. Sir Isaac Newton believed that if the earth were compressed so that its particles would be in actual contact, it would occupy the space of but one cubic inch.

With the first advance from the unknown of matter to the known, we would have the substance which filled all space, changing from the mere potential to the atomically real, and thus entailing also the production of *space intervals* between the atoms. This is expressed in the myth by Gæa producing Uranus like to herself, and then the Ourea, those charming *ἐναύλους* or space intervals, inhabited by their own peculiar forces that tend to keep the atoms apart.

CHAPTER III.

IN FORMAL CHAINS.

FURTHER evolution on the part of our universe should bring a further advance in the nature of those atoms, as also in that of the force associated with them, for force and matter are inseparable, and we know of one only through the other. Helmholtz writes thus:—

“When the nebulous chaos first separated itself from other fixed star masses, it must not only have contained all kinds of matter which was to constitute the future planetary system, but also, in accordance with our new law, the whole store of force which at one time must unfold therein its wealth of actions. Indeed in this respect an immense dower was bestowed in the shape of the general attraction of all the particles for each other. This force, which on the earth exerts itself as gravity, acts in the heavenly spaces as gravitation. . . . The chemical forces must have been also present, ready to act; but as those forces can only come into operation by the most intimate contact of the different masses, condensation must have taken place before the play of chemical forces began.”

This would mean the production of atoms endowed with magnitude, of chemical force, and of physical force; and this, as will be shown, is what Mythology teaches by asserting that from Gæa and Uranus, or substance with form, were produced the Titans, the Cyclopes, and the Hecatoncheires.

Which of these came into being in the order of precedence, if precedence there was? Did force impress itself on matter, or matter on force? There are advocates for each supposition in our philosophies of to-day, and it would seem as if the same dispute was a matter of opinion

among the ancients, judging from the mere sequence in which they are mentioned by Hesiod and Apollodorus. The former, when mentioning the offspring of Uranus and Gæa, does so in the order of Titans, Cyclopes, and Hecatoncheires; rather, however, of forced order than of actual precedency, since δ'αὖ and ἄλλοι δ'αὖ could signify “and moreover” and “and others too” respectively. Apollodorus, on the other hand, would appear to be more positive and precise, seeing that he names them in the order of Hecatoncheires, Cyclopes, and Titans, and that he also uses ἐτέκνωσε πρώτους for the Hecatoncheires, μετὰ τούτους δὲ τέκνοι for the Cyclopes, and—after a notable digression—τέκνοι δὲ αὖθις for the Titans. He would thus lead us to infer that the Physical forces were first, that the Chemical forces succeeded the Physical, and that the Titans or matter *may* have been among the first or subsequent to the first, for αὖθις can be considered as indefinite in time and order.

CHAPTER IV.

MOLECULAR MATTER.

Titans.

αὐτὰρ ἔπειτα

Οὐρανῷ ἐννηθεῖσα τέκ' Ὀκεανὸν βαθυδίνην,
 Κοῖόν τε Κρῖόν τ', Ὑπερίονά τ' Ἰαπετόν τε,
 Θείαν τε Ῥεῖαν τε, Θέμιν τε Μνημοσύνην τε,
 Φοῖβην τε χρυσοστέφανον Τηθύν τ' ἐρατεινήν.
 τοὺς δὲ μέθ' ἀπλότατος γένετο Κρόνος ἀγκυλομήτης,
 δεινότατος παίδων· θαλερόν δ' ἤχθηρε τοκῆα.

Theog. 132—138.

But bedded then with Uranus she bore
 Deep-rolling Oceanus, Cœus too,
 Crius, Hyperion, and Iapetus,
 Thea, Rhea, Themis, Mnemosyne,
 Phœbe with crown of gold, and Tethys loved.
 And after these her youngest, mightiest child,
 The wily counselling Kronos was produced;
 But he opposed was to his haughty sire.

THE Atomic Theory supposes atoms as being the smallest conceivable particles of matter, incapable of division physically or chemically, inappreciable to the senses and the microscope, and about whose size, shape, and absolute weight we have no certain knowledge. They are thus as purely hypothetical creations with respect to matter as are points with respect to lines, surfaces, and solids. Each has position but no magnitude. The union of any number of things possessing of themselves no magnitude ought still to give *no* magnitude, and yet we postulate points and atoms as respectively producing lines and molecules, each of which *has* magnitude. How the change has been done it is difficult to understand, but it gave to existing substance and quality the additional accident of quantity, and thus transformed the theoretical to the real, the atoms to molecules. A wondrous change, a vast stride in Evolution was

this that had been accomplished. The invisible was changed to the visible, the indivisible to the divisible, and matter that had previously been but the very fabric of a dream became invested with shape and size and weight, with what constitutes the hard and the soft, the dry and the wet, the hot and the cold, with all that tends to make earth, water, fire, and air, or in other words, the solid, fluid, and gaseous constituents that make up the matter of our universe. The whole aspect of creation was consequently altered, and all because of the assumption of magnitude ; all because of the *atoms stretching themselves* to length, to breadth, and to thickness ; all because of the *Titans* having been born.

There can be no doubt of the mythical personification of those Titans. Their genealogy, order of coming, necessity for existence, and their kindred, all point to the one conclusion. Hesiod calls them *χθονίους Τιτῆνας*, "earthly Titans," in line 697 of his Theogony. Their own father, Uranus, gave them the appellation when, on the eve of his expulsion, he reproached them for an act that earned for themselves a name and deprived him of further control. Thus :

- 1 Τοὺς δὲ πατὴρ Τιτῆνας ἐπὶ κλῆσιν καλέεσκεν
παῖδας νεκείων μέγας Οὐρανὸς οὗς τέκεν αὐτός.
φάσκει δὲ τιταίνοντας ἀτασθαλίῃ μέγα ῥέξαι
4 ἔργον, τοίῳ δ' ἔπειτα τίσιν μετόπισθεν ἔσεσθαι.

Theog. 207—210.

Reproaching then the children whom he bore,
Their sire, great Uranus, them Titans called.
Declared he too, that *stretching* as they did
Against his haughtiness, a mighty work
They had accomplished, but of such a kind
As would hereafter be a punishment.

NOTES.

- 4 *τίσιν μετόπισθεν*—A prophetic threat, since those molecular Titans were fated to lose their own individuality later on, when their efforts at extension caused molecules to be merged in molar masses and compounds.

The very name is significative, as we see, of the sense meant. When we examine the word *Τιτάν* we find it com-

posed of $\tau\iota$ and $\tau\acute{\alpha}\nu$; of these $\tau\iota$ means "some being, some creature, some thing, anything conceivable," and $\tau\alpha\nu\acute{\iota}\omega$ is "to stretch, to strain, to extend." So that *Titan* is literally "substance extended," or "substance with magnitude," that is, *molecular matter*. This, by the way, shows that contrary to what is sometimes asserted, there is nothing pleonastic in the use of $\text{o}\ddot{\upsilon}\delta\epsilon\nu\ \tau\iota$ or $\mu\acute{\eta}\delta\epsilon\nu\ \tau\iota$, seeing that they would mean "not a single thing, not a particle."

By this real or molecular matter, then, in contradistinction to the theoretical or atomic, must we understand those mythical Titans, the far-famed beings who revolted against the indefinite Uranus and were successful, who warred against Zeus, more definite than themselves, and were overthrown—hurled to Tartarus by the Life that conquered but could not annihilate them; who, during the ten full cycles that we are told the battle lasted, stretched their limbs to space in the accomplishment of what was to be; who fashioned Sirius, our Sun, and suns like to both; and who acted as the forbears of the stars above us, the atmosphere around us, the seas that divide us, and of the earth—the common clay from which plant and animal have the matter of their being.

It may be, perhaps, that while conviction is established in the mind as to the identity of Titans and Molecules, a feeling of disappointment may be left when comparing a simple molecule of matter with one of those Titanic beings whom the all-powerful Zeus could not destroy till aided by the lightning forged for him by the Cyclopes?

Such a feeling must vanish when we recall what Science tells with regard to the enormous force that must be brought to bear in order to overcome molecular union: "The quantity of electricity required to decompose a single drop of water is estimated to be equal to a powerful flash of lightning."

To change a molecule of aqueous vapour to a molecule of snow demands, says Tyndall, "an exertion of energy competent to gather up the shattered blocks of the largest stone avalanche I have ever seen, and pitch them to twice the height from which they fell."

CHAPTER V

CHEMICAL FORCE.

Cyclopes.—Matter, as suggested by some writers, may be only one in its nature, and compound bodies but phases of that one condition. A similar theory is observable in the later myths that make “Titan” the oldest of the Titanic progeny, and the one who gave the empire of the world to Kronos on condition of his bringing up no male children.

But so far as is yet discovered there are about seventy simple substances to which all known bodies can be reduced ; and these, as being incapable of further separation, are called Elements. An atom must consequently be the smallest conceivable part of an element, one which is indivisible. A molecule consists of two or more atoms, and is defined as “the smallest particle of any kind of matter that can subsist alone.” It resembles an atom in being inappreciable to the senses or microscope, and in being separated from other molecules by pores. It differs from an atom in possessing individuality and divisibility. This divisibility is into atoms, and cannot be accomplished by mechanical or physical means. Trituration and solution may weaken the cohesion that binds the atoms, but there is only one means, *Chemical force*, that can separate the atoms from the molecule.

Since atoms are incapable of separate subsistence, it follows that, when separated from one molecule, they immediately enter into combination with other atoms to form another molecule of a different kind of matter, and this is done by the same chemical force that decomposed them. A molecule is thus, as it were, what the body is to the soul, a garment for atoms, one which they wear to-day

and discard to-morrow for another according as desire or chemical affinity may prompt. If there were but one kind of matter there might be desire but no chemical play, for chemical force can only operate as a rule between bodies of a different nature. Two or two thousand molecules of oxygen alone, or of hydrogen alone, would for ever remain the same; but a mixture of the two in the proportion of one to two by bulk, or of eight to one by weight, will produce an entirely new substance, and we find a molecule of water acting for the time being as a garment of oxygen and hydrogen, and one which they will retain until such time as a more enticing fabric, potash for instance, comes within their means.

It is this *chemical force* that has been personified as *Cyclopes* in mythology. The following comparison will tend to strengthen the truth of the assertion :

We must presuppose atomic matter to arrive at chemical force : the Cyclopes were sprung from Uranus and Gæa. Chemical force is closely allied with physical force and molecular matter : the Cyclopes were kin to the Hecatoncheires and Titans. While the atomic matter of our universe was passing into molecular, chemical and physical forces would be latent : the Cyclopes and Hecatoncheires were imprisoned in the womb of Gæa. Chemical force comes into play when powerful changes are in operation : the Cyclopes were liberated by Kronos to expel Uranus, and by Zeus to expel Kronos. Chemical force is essentially directed against molecules : the Cyclopes warred against the Titans. Thunder and lightning are the grandest natural exhibitions of chemical force : thunder and lightning were fabricated by the Cyclopes. Heat is a prime agent for making chemical force operate : the Cyclopes were the assistants of Vulcan. Chemical force is ever active in volcanoes : volcanoes were the workshops of the Cyclopes.

Let us now pass to the name itself. Considered as a whole, chemical force cannot be said to create anything of itself; it but takes matter already formed, an atom or atoms here, an atom or atoms there, and combines

them. Colour, shape, hardness, specific gravity, &c., are not really its creations: such are latent in the matter itself or brought about by other forces. It takes 1 lb. of hydrogen and 8 lbs. of oxygen, and turns them over to 9 lbs. of water; it takes 105 lbs. of iron and 120 lbs. of sulphur, and turns them over to 225 lbs. of iron pyrites. It can reverse the process and change back the 9 lbs. of water to its constituents, but we get no more, no less than 8 lbs. of oxygen and 1 lb. of hydrogen; so, too, with the pyrites. In each case, the transference is complete, but increase or diminution there is none. There has been a total change of properties, it is true,—but it has simply *robbed* Peter to pay Paul. And in this sense it is that Mythology has given the name of Cyclopes to Chemical force.

The derivation, κύκλος ὤψ “round eyed,” universally given it, rests on the following lines of Hesiod:

Κύκλωπες δ' ὄνομ' ἦσαν ἐπώνυμον, οὐνεκ' ἄρα σφέων
Κυκλοτερὴς ὀφθαλμὸς ἔεις ἐνέκειτο μετώπῳ.

Theog. 144.

But the poet only calls the name an “*auspicious*” one, prophetically significant or *ominous* (ἐπώνυμος) of the volcanoes that were to come *afterwards* and serve, through what may be called the one round eye or crater, as mediums for the exhibition of Chemical force. Hesiod seldom assigns the derivation of a name to his personages, permitting it rather to be gathered from the nomenclature and context; but when he does, he uses as a prelude such words as καλέεσκεν, as in the case of the Titans; or κικλήσκουσι, as in the case of Aphrodite. We have instances, similar to the Cyclopes, in the names Chrysaor and Pegasus, of which he also says τῷ μὲν ἐπώνυμον ἦν, and yet as we shall see, χρυσός and πηγὴ do not enter directly into the derivations. When we find then the word ἐπώνυμον used, the quick conclusion is that the *true* derivation is different from the chance resemblance, and that Hesiod but commented on the suitability of the name to phenomena that were to appear afterwards.

However time-honoured, then, be the usual derivation we

are compelled to ignore it and to suggest κύος κλώψ, "a robber of the embryo, a robber of what is already conceived or made," as the proper one. This, too, would be in accordance with our own definition of Chemical force, "one that destroys the properties of the substance engaged and gives rise to a new kind of matter." The whole aim of the force is to *compose*, but it cannot possibly do this without first *decomposing or robbing something already in existence*. Decomposition and robbing may sound different, but the idea involved is identical and is confessedly the essential characteristic that distinguishes Chemical force from all others. This same characteristic would bring back the idea of the force and its mode of action to the nebulous age where it had a being,—an all-important point to be taken into consideration. There were no volcanoes in that age. How then can we associate κύκλος ὥψ as significative of what was *yet* to be, with chemical force which already *was*? Κύκλος ὥψ would suit only a particular epoch or epochs of the world: κύος κλώψ will suit all time. The Læstrygones, too, described as the most ancient possessors of Sicily and devourers of human flesh, must evidently be classed among the volcanic agencies, *descendants* as it were of the *original Cyclopes*; and here the derivation comes out in the open, namely, ληϊστήρ γίνομαι "the robber born."

And while on this subject, let us say that it is not at all certain but that our own word "*chemistry*" has for its radical the selfsame idea permeating the Greek "*Cyclopes*." The derivations assigned it are by no means satisfactory, and the word itself has been handed down through mediæval times as a relic of the alchemy that had *transmutation* for its fundamental. The Greek word for chemistry, χημεία, would seem by a simple transposition to be derived from μῆχος, "a contrivance, artificial means," and we would thus have both "*Mechanics*" and "*Chemistry*" descended from the same root,—very properly, too, when we consider that chemistry is but Nature's mechanics. If we derive this μῆχος from μή ἔχω (and "artificial" implies "that

which is really not”), we find the same idea of “not having of their own” running through both Cyclopes and Chemistry.

Be this as it may, we see that Mythology had a well-defined idea of chemical force; that it considered it as dependent upon matter already existing, as stealing from this matter in order to form new combinations, and as but repeating the same “modus agendi” when, after the solid crust was formed, volcanoes emitted from their craters what had been robbed from the igneous interior.

The crater is to the volcano what decomposition is to the molecule—a means whereby chemical force can see the light or, in other words, can use its eye. Volcanic energy can rend a mountain for its eye to see: chemical force can decompose a molecule for its eye to see. A molecule is a volcano in miniature, and the eye is as much resident *in* the one as *in* the other, and composed of matter simpler than its envelope,—of visible lava, let us say, in one case; of invisible atoms certainly, in the case of the molecule, since there is nothing simpler in it. “Chemical force,” says Attfield, “appears to reside *in* atoms, that is to say, it is exerted inside a molecule, while all other forces affect entire molecules.”

Nor does it make any difference whether there be two or two hundred atoms in a molecule. They may penetrate one another and be a unit in it for all we know, since impenetrability applies no more to atomic matter than does extension or divisibility or any of the other properties that come into being only with molecular matter. To Chemical force acting on that molecule all its atoms are certainly a unit in which the force resides, whether for attraction, decomposition, or combination, and just as the centre of gravity is the *point d'appui* of mechanical force, so is the atom the *point de vise*, or eye, of chemical force.

Locked up in the molecule it is dormant until chemical affinity occurs, and by its agency rends the molecule and enables the atom to see for a time, infinitesimally brief though that time be, before it again enters into new

combinations. And it is only by this *robbing* agency that the atom (*κῡος*) or the eye (*κῡαρ*) can see. As in the case of the Titans, the Cyclopes earned an appellation from their action.

Whenever and however Chemical force may act, we cannot conceive it as instantaneous. There must be a succession of events associated with its operation. The mind must call into being hydrogen and oxygen separately before the conception of water is evolved; carbon and sulphur separately before carbon disulphide is evolved. "We must regard an atom," to quote Attfield again, "as the home of an attractive force of great intensity; but a free, uncombined atom we cannot conceive as existing for any appreciable length of time. Freed from one combination it finds itself in proximity to other atoms having similar desires for union: the result is an impetuous rushing together and formation of either couples, trios, or groups, according to the nature of the atoms." We thus see that there are three distinct stages in chemical action, namely, Attractive strength; Decomposition; and Composition, formation, or molecular union. These same three agencies are well depicted in one of Hesiod's lines:—

ἰσχύς τ' ἡδὲ βίη καὶ μηχαναὶ ἦσαν ἐπ' ἔργοις.

Theog. 146.

They are also personified in Brontes, Steropes, and Arges, —Brontes (*βρι-δνρα*) "the innate force of matter"; Steropes (*στερέω ὄψ*) "the robbing of the eye"; Arges (*ἔργον*) "the formation or work"; Brontes, Steropes, and Arges, who forged for Zeus "the thunder and the lightning, and the blazing bolt"; for Neptune, the famous trident whose three prongs stand for the solid, fluid, and gaseous conditions of water; and for Pluto, the crust of earth which chemical action has joined and solidified, the solid crust that acts as a helmet to protect and cover from our view the powers below.

Hesiod thus introduces the Cyclopes:

- 1 γείνατο δ' αὖ Κύκλωπας ὑπέρβιον ἦτορ ἔχοντας,
 Βρόντην τε Στερόπην τε καὶ Ἄργην ὀβριμόθυμον,
 οἱ Ζηνὶ βροντὴν τ' ἔδοσαν τεύξάν τε κεραυνόν.
 οἳ δ' ἦτοι τὰ μὲν ἄλλα θεοῖς ἐναλίγκιοι ἦσαν,
 5 μῦθος δ' ὀφθαλμὸς μέσσω ἐνέκειτο μετώπῳ.
 Κύκλωπες δ' ὄνομ' ἦσαν ἐπώνυμον, οὐνεκ' ἄρα σφέων
 Κυκλοτερὲς ὀφθαλμὸς ἔεις ἐνέκειτο μετώπῳ
 8 ἰσχύς τ' ἡδὲ βίη καὶ μηχαναὶ ἦσαν ἐπ' ἔργοις.

Theog. 139—146.

She also bore the Cyclopes that have
 A heart unconquered, Brontes, Steropes,
 And the strong-minded Arges, all of whom
 For Zeus the thunder gave and shaped the bolt.
 Like to the gods in all respects were they,
 Save that there lay in middle of their front
 A single eye. And "Cyclopes" was thus
 A name auspicious, since one rounded eye
 Within their forehead lay. And in their deeds
 Were strength and force and structural designs.

NOTES.

- 1 ὑπέρβιον ἦτορ—The indestructible atom.
 2 ὀβριμόθυμον—The intense desire of atoms for combination. Apollodorus names the Cyclopes in the order of Arges, Steropes and Brontes. There is really no difference which of the extremes goes first, provided that Sterope or decomposition be in the middle.
 5 μέσσω μετώπῳ—A molecule of matter is generally supposed to be *spherical*: if so, the front is *any and every portion of the surface*, and the middle of the front must consequently be the *central point* of the molecule.

The later myths deal principally with the Cyclopes as volcanic agencies. Thus the well-known relationship of volcanoes to land bordering on the sea, or to insular masses, accounts for the Cyclopes being described as children of Neptune. "The presence of volcanoes on or close to the coast," says Bonney, "suggest that their paroxysmal activity, perhaps their existence, depends on the proximity of water."

They are gigantic in size. Two miles is the height of *Ætna*, and this particular Cyclop is but a baby to some of his brothers, such as *Mauna Loa* and *Cotopaxi*. Their cannibal propensities have been experienced by many a

Pompeii and Herculaneum, and by many, too many, thousands destroyed by the deadly fire damp and choke damp of our mines. And when we behold such mighty structures as Ætna, Teneriffe, Loa and Kea in the Sandwich Islands, and many others,—when we see the immense cones superimposed upon the colossal Chimborazo and others of the Andes,—when, especially, we gaze with wonder on the trap formations as seen in the Giant's Causeway and the Palisades, and are told by geologists that all these are the works of volcanic action, we must heartily coincide with Mythology when it says “the most solid walls and impregnable fortresses are said to be the work of the Cyclopes.”

Chemical force was a fruitful theme for the classic poets, affording as it did a wide field of knowledge, extended observation, and the use of highly figurative language. The greater part of the 9th book of the Odyssey is devoted to the Cyclopes, and all through the close connection between volcanic agency and chemical force is apparent. They are thus introduced :

- 1 Κυκλώπων δ' ἐς γαίαν υπερφιάλων, ἀθεμίστων,
 ἰκόμεθ', οἳ ῥα θεοῖσι πεποιθότες ἀθανάτοισιν,
 οὔτε φυτεύουσιν χερσὶν φυτὸν, οὔτ' ἀρώσιν·
 ἀλλὰ τάγ' ἄσπαρτα καὶ ἀνήροτα πάντα φύονται,
- 5 πυροὶ, καὶ κριθαὶ, ἦδ' ἄμπελοι, αἵτε φέρουσιν
 οἶνον ἐριστάφυλον, καὶ σφιν Διὸς ὄμβρος ἀέξει.
 Τοῖσιν δ' οὔτ' ἀγοραὶ βουλευφόροι, οὔτε θέμιστες·
 ἀλλ' οἷγ' ὑψηλῶν ὀρέων ναίουσι κάρηνα,
 ἐν σπέσσι γλαφυροῖσι· θεμιστεύει δὲ ἕκαστος
- 10 παίδων ἦδ' ἀλόχων· οὐδ' ἀλλήλων αἰλέγουσι.

Odys. 106—115.

Then come we to the land of Cyclopes,
 The overflowing, arbitrary, who
 Relying merely on the immortal Gods,
 Nor plant with hands a crop nor do they till,
 But all things grow, indeed, unsown, untilled,
 The grain of wheat and barley, vines that bear
 Rich grapy juice, and Jove's rain fosters such.
 For them are neither parliaments nor laws ;
 But in the scooped out caves upon the peaks
 Of mountains huge they dwell ; and each his wives
 And children rules ; of others reck they not.

NOTES.

- 1 *ὑπερφιάλων*. *ὑπὲρ φιάλη*—"Running over the bowl" or crater. From the peculiarity exhibited by volcanic rocks of resting upon other rocks as if they had *overflowed*, they have been called "overlying" by some writers on geology.
- ἀθεμίστων*—*α θέμις*, "not adhering to the law of right," i.e. robbers.
- 2 *πεποιθότες*—Chemical force depends on what is already in existence. At the same time it is independent of Life and all other forces, as the Cyclops tells Ulysses.

Οὐ γὰρ Κύκλωπες Διὸς αἰγιόχου ἀλέγουσιν,
οὐδὲ θεῶν μακάρων ἐπειὴ πολὺ φέρτεροι εἰμὲν.

Odyss. IX. 275—6.

- 4 "Most of the volcanic rocks produce a fertile soil by their disintegration. It seems that their component ingredients, silica, alumina, lime, potash, iron, and the rest, are in proportion well fitted for vegetation."—Lyell.

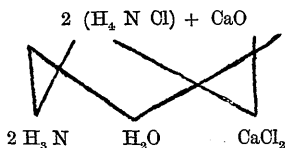
It is well to observe, too, that *πυροί, κριθαί*, and *ἄμπελοι* are but thinly veiled allusions to the *attractive energy* (*πῦρ*), *decomposition* (*κρίνω—ἐκρίθην*), and *combination* (*ἀνά πελάω*) of chemical force, ending in the production of lava, or of rock in a molten state (*οἶνον*).

- 6 *ἐριστάφυλον*.—As if *ἐρι-στάζω φυλή* "in an exceedingly fluid condition."

ἄμβρος.—Underground water plays an important part in the stirring up of volcanic action.

- 7 *οὐτ' ἄγοραί β*.—There is no delay or restraint to chemical force. When the proper conditions are present it acts without consultation or check. There may also be reference to the generally isolated position of volcanoes.

- 9 *θεμιστεύει ἕκαστος*.—The respective atoms are governed by their own *affinities* (*παίδων ἢ δ' ἀλόχων*). Every chemical reaction is the best translation of the poet's concluding lines. Here is an instance. Heat Sal Ammoniac (H_4NCl) with Lime (CaO), and the reaction will be



"And each his wives
And children rules : of others reck they not."

In the 13th Book of his *Metamorphoses*, Ovid writes at length of the Cyclop Polyphemus. It affords an excellent illustration of the assertion that scientific truth is the theme which runs through a no inconsiderable portion of classic poetry. Instead of being a silly and grotesque love story with a preposterous transformation, it is a vivid description of a volcanic outburst and its after effects, written with the master hand of a poet and a scientist.

He takes a newly elevated promontory and calls it *Acis*; the elements of matter that were embraced by this promontory, and calls them *Galatea*; chemical force, and calls it *Polyphemus*; and a long-dormant volcano which he styles *Ætna*. All that occurred is thus retrospectively described by *Galatea*:

- 1 *Acis erat Fauno nymphaque Symæthide cretus,*
Magna quidem patrisque sui matrisque voluptas,
Nostra tamen major. Nam me sibi junxerat uni,
Pulcher: et octonis iterum natalibus actis
- 5 *Signarat dubia teneras lanugine malas.*
Hunc ego, me Cyclops nulla cum fine petebat:
Nec, si quæsieris, odium Cyclopis, amorne
Acidis in nobis fuerit præsentior, edam:
Par utrumque fuit. Pro quanta potentia regni
- 10 *Est, Venus alma, tui! nempe ille immitis et ipsis*
Horrendus sylvis, et visus ab hospite nullo
Impune, et magni cum dīs contemptor Olympi,
Quid sit amor, sentit, nostrique cupidine captus
Uritur, oblitus pecorum antrorumque suorum.
- 15 *Jamque tibi formæ, jamque est tibi cura placendi:*
Jam rigidos pectis rastris, Polypheme, capillos:
Jam libet hirsutam tibi falce recidere barbam,
Et spectare feros in aqua et componere vultus.
Cædis amor feritasque sitisque immensa cruoris
- 20 *Cessant, et tutæ veniuntque abeuntque carinæ.*
Telemus interea Siculam delatus ad Ætnen,
Telemus Eurymides, quem nulla fefellerat ales,
Terribilem Polyphemon adit, "Lumen" que, "quod unum
Fronte geris media, rapiet tibi" dixit "Ulixes."
- 25 *Risit, et "O vatum stolidissime, falleris" inquit:*
"Altera jam rapuit." Sic frustra vera monentem
Spernit, et aut gradiens ingenti litora passu
Degravat, aut fessus sub opaca revertitur antra.

Prominet in pontum cuneatus acumine longo
- 30 *Collis: utrumque latus circumfluit æquoris unda.*

- Huc ferus ascendit Cyclops, mediusque resedit.
 Lanigeræ pecudes, nullo ducente, secutæ.
 Cui postquam pinus, baculi quæ præbuit usum,
 Ante pedes posita est, antennis apta ferendis,
 35 Sumptaque arundinibus compacta est fistula centum,
 Senserunt toti pastoria sibila montes,
 Senserunt undæ. Latitans ego rupe, meique
 Acidis in gremio residens, procul auribus hausi
 Talia dicta meis, auditaque mente notavi :
 40 " Candidior folio nivei, Galatea, ligustri,
 Floridior pratis, longa procerior alno,
 Splendidior vitro, tenero lascivior hædo,
 Levior assiduo detritis æquore conchis,
 Solibus hibernis, æstiva gratior umbra,
 45 Nobilior forma, platano conspectior alta,
 Lucidior glacie, matura dulcior uva,
 Mollior et cygni plumis et lacte coacto,
 Et, si non fugias, riguo formosior horto.
 Sævior indomitis eadem Galatea juvenicis,
 50 Durius annosa quercu, fallacior undis,
 Lentior et salicis virgis et vitibus albis,
 His immobilior scopulis, violentior amne,
 Laudato pavone superbior, acrior igni,
 Asperior tribulis, foeta truculentior ursa,
 55 Surdior æquoribus, calcato immitior hydro,
 Et, quod præcipue vellem tibi demere possem,
 Non tantum cervo claris latratibus acto,
 Verum etiam ventis voluerique fugacior aura.
 At, bene si noris, pigeat fugisse, morasque
 60 Ipsa tuas damnes, et me retinere labores.
 Sunt mihi, pars montis, vivo pendentia saxo
 Antra, quibus nec Sol medio sentitur in æstu,
 Nec sentitur hiems. Sunt poma gravantia ramos :
 Sunt auro similes longis in vitibus uvæ :
 65 Sunt et purpureæ : tibi et has servamus, et illas.
 Ipsa tuis manibus silvestri nata sub umbra
 Mollia fraga leges, ipsa autumnalia corna,
 Prunaeque, non solum nigro liventia succo,
 Verum etiam generosa novasque imitantia ceras.
 70 Nec tibi castaneæ me conjuge, nec tibi deerunt
 Arbuti foetus : omnis tibi serviet arbor.
 Hoc pecus omne meum est : multæ quoque vallibus errant,
 Multas silva tegit, multæ stabulantur in antris.
 Nec, si forte roges, possim tibi dicere, quot sint :
 75 Pauperis est numerare pecus. De laudibus harum
 Nil mihi credideris : præsens potes ipsa videre,
 Ut vix circumeant distentum cruribus ubæ.

- Sunt, foetura minor, tepidis in ovilibus agni :
 Sunt quoque, par ætas, aliis in ovilibus hædi.
- 80 Lac mihi semper adest niveum : pars inde bibenda
 Servatur : partem liquefacta coagula durant.
 Nec tibi deliciæ faciles, vulgataque tantum
 Munera contingent, damæ, leporesque, caperque,
 Parve columbarum, demptusve cacumine nidus :
- 85 Inveni geminos, qui tecum ludere possint,
 Inter se similes, vix ut dignoscere possis,
 Villosæ catulos in summis montibus ursæ :
 Inveni, et dixi, "Dominæ servabimus istos."
 Jam modo cœruleo nitidum caput exsere ponto,
- 90 Jam, Galatea, veni, nec munera despice nostra.
 Certe ego me novi, liquidæque in imagine vidi
 Nuper aquæ, placuitque mihi mea forma videnti.
 Aspice, sim quantus. Non est hoc corpore major
 Jupiter in cœlo : nam vos narrare soletis
- 95 Nescio quem regnare Jovem. Coma plurima torvos
 Prominet in vultus, humerosque, ut lucus, obumbrat.
 Nec mihi quod rigidis horrent densissima setis
 Corpora, turpe puta : turpis sine frondibus arbor :
 Turpis equus, nisi colla jubæ flaventia velent.
- 100 Pluma tegit volucres : ovibus sua lana decori est :
 Barba viros hirtæque decent in corpore setæ.
 Unum est in medio lumen mihi fronte, sed instar
 Ingentis clypei. Quid ? Non hæc omnia magno
 Sol videt e cœlo ? Soli tamen unicus orbis.
- 105 Adde, quod in vestro genitor meus æquore regnat :
 Hunc tibi do socerum. Tantum miserere, precesque
 Supplicis exaudi : tibi enim succumbimus uni :
 Quique Jovem et cœlum sperno et penetrabile fulmen,
 Nerei, te vereor : tua fulmine sævior ira est.
- 110 Atque ego contemptus essem patientior hujus,
 Si fugeres omnes. Sed cur Cyclope repulso
 Acin amas ? præfersque meis amplexibus Acin ?
 Ille tamen placeatque sibi, placeatque licebit,
 Quod nollem, Galatea, tibi, modo copia detur
- 115 Sentiet esse mihi tanto pro corpore vires.
 Viscera viva traham, divulsaque membra per agros,
 Perque tuas spargam—sic se tibi misceat!—undas.
 Uror enim, læsusque exæstuat acrius ignis :
 Cumque suis videor translatam viribus Ætnam
- 120 Pectore ferre meo : nec tu, Galatea, moveris."

Talia nequicquam questus—nam cuncta videbam—
 Surgit, et ut taurus vacca furibundus adempta,
 Stare nequit, silvaque et notis saltibus errat.

- Cum ferus ignaros, nec quicquam tale timentes
 125 Me videt atque Acin, "Videoque" exclamat, "et ista
 Ultima sit, faciam, veneris concordia vestrae."
 Tantaque vox, quantam Cyclops iratus habere
 Debuit, illa fuit. Clamore perhorruit Ætne.
 Ast ego vicino pavefacta sub æquore mergor.
 130 Terga fugæ dederat conversa Symæthius heros,
 Et "Fer opem, Galatea, precor, mihi; ferte parentes,"
 Dixerat "et vestris periturum admittite regnis."
 Insequitur Cyclops, partemque e monte revulsam
 Mittit: et extremus quamvis pervenit ad illum
 135 Angulus is montis, totum tamen obruit Acin.
 At nos, quod solum fieri per fata licebat,
 Fecimus, ut vires assumeret Acis avitas.
 Puniceus de mole cruor manabat, et intra
 Temporis exiguum rubor evanescere cœpit:
 140 Fitque color primo turbati fluminis imbre,
 Purgaturque mora. Tum moles fracta dehiscit,
 Vivaque per rimas proceraque surgit arundo:
 Osque cavum saxi sonat exsultantibus undis:
 Miraque res, subito media tenus exstitit alvo
 145 Incinctus juvenis flexis nova cornua cannis,
 Qui, nisi quod major, quod toto cœrulus ore,
 Acis erat. Sed sic quoque erat tamen Acis in amnem
 Versus. Et antiquum tenuerunt flumina nomen.

Met. XIII. 750—897.

From Faunus and the nymph Symæthis sprung
 Was Acis, aye his parents' great delight,
 Still greater ours. Me to himself as one
 He comely joined, and, years twice eight elapsed,
 Displayed his tender cheeks with dubious growth.
 Him I, the Cyclop me, unceasing craved;
 Nor questioned can I tell if livelier were
 Our hate of Cyclop, or of Acis love:
 'Twas even both. How potent is thy sway,
 O fervent love! for he most hard of heart,
 And source of dread unto the very woods,
 And by no entertainer viewed unharmed,
 And holding in contempt Olympus vast
 With gods thereof, now feels what love can be,
 And, all oblivious of his flocks and caves,
 Is captive kindled through desire of me.
 And now is form, attraction now thy care;
 Anon, O Polyphemus, dost thou beat
 Thy matted locks with harrows; yet anon
 Art keen to cut with blade thy bristling beard,
 View thy fierce looks in vapour, and combine.

Dormant the wanton love of slaughter is,
 And savagery, and thirst immense for gore ;
 And vessels safely come and safely go.
 Meanwhile, unto Sicilian Ætna borne
 The rumour far, of wide report begot,
 (Swift rumour that no bird had e'er outdone,)

Approaches Polyphemus grim and spoke :

" Ulysses yet will snatch the single eye
 Thou bearest in the middle of thy front ! "

He scoffed and said, " Not so, most foolish seer ;
 Another's snatched it now ! " Contemns he thus
 It telling truth in vain ; and presses down,
 Traversing with huge stride, the shores ; or tired
 Is 'neath his sheltered caves again restored.

Wedged in the promontory long a hill
 Hangs o'er the deep ; the sea surrounds each side.
 Here mounts the Cyclop fierce, and midway stopped.
 Without a guide there followed fleecy crowds :
 Before his feet was later fixed a pine,
 For mainyard fit, that served him for a club ;
 A pipe with hundred shafts was got and framed ;
 The mountains all the growing rumblings felt,
 Felt too the waves. Concealed within the rock
 And in my Acis' bosom nestling close,
 I drank from far with ears of mine those words
 And pondered well in mind o'er what I heard :

" Oh, Galatea ! fairer than the flower
 Of privet white, more blooming than the swards,
 Stauncher than alder firm, than glass more bright,
 More wanton than the kidling, smoother far
 Than shells soft polished by the constant sea,
 Sweeter than wintry suns, than summer's shade,
 Nobler than form, plainer than platane tree,
 Clearer than ice, than ripe grape daintier,
 Softer than down of swan, and milk when pressed,
 More beauteous than an Eden, did'st but stay.
 Ah, Galatea ! wilder thou the same
 Than steers untamed, harder than aged oak,
 More fickle than the waves, more easy bent
 Than twigs of osier and than whity vines,
 More steadfast than those rocks, stronger than flood
 Prouder than peacock vain, fiercer than fire,
 Rougher than thorns, vengeful more than snake
 When trodden on, and (what I most would fain
 I could deprive thee of), more fleeting than
 Not deer alone urged on by bayings loud,
 But even than the winds and passing breeze.

Did'st know me well 'twould grieve thee to have fled,
And voluntarily wouldst thou condemn
Thy own delays and strive to hold me back.
Poised in the living rock are antres mine,
Of mount a part, in which midsummer's sun
Nor winter's cold is felt : russets there are
Weighing the branches down ; in the long boughs
Are golden currants,—there are dark ones too ;
And these for thee we save and those as well.
With thy own hands, O child of matter's shade,
Thou'lt gather soft fragarias, the late
Cornels and prunes that livid with false juice
Not only are, but open-handed too,
And imitating honeycombs in shape.
Nor arbutue growths nor chestnuts thee will fail
When yoked to me. Each shrub will be thy slave.
This stock's all mine : yet many roam in vales,
The grove clothes more, and more are housed in caves.
Nor could I tell *how* many, should'st thou ask :
'Tis test of poverty to count one's stock.
As to their praises trust me nought ; thou canst
In person see how scarce they move around
The udder wide distended 'twixt their thighs.
In their warm folds are lambs, a lesser breed ;
In other folds, too, kids, of equal age.
For me the milk is ever white ; a part
Is liquid kept, moist clots make hard the rest.
Such cheap delights and gifts too mean, as deer,
And hares, and goat, small share of doves, and nest
That's robbed from craggy peak, affect thee not :
Twins that can play with thee I've found, the cubs
Of polar she-bear in the furthest mounts,
So like that thou couldst scarce tell them apart :
I found and said, ' We'll keep them for our queen.'
From depths of blue raise now thy simple head ;
Come, Galatea, now, nor spurn our gifts.
Surely I've known and seen myself of late
In liquid water's shape, and to mine eye
My form was pleasing. See, how great I am.
Not greater than this body is the Jove
In heaven's expanse,—for ye are wont to tell
That he, the Jove whom I know nought of, rules.
A wealth of hair hangs o'er my features stern
And hides my shoulders like a grove. Nor, since
The firmest bodies with coarse hairs are stiff,
Think base of me : base is the leafless tree,
The steed whose shining neck no mane adorns.

Plumage clothes birds ; for sheep is wool a grace ;
 Rough hairs on body and a beard suit men.
 One eye I have in midmost front, but large,
 Large as a mighty shield. What then ?
 Sees not the sun all things from vasty heaven ?
 Yet for this sun is but a single orb.
 My founder, mark it well, rules in your sea :
 Him as a sire-in-law to thee I give.
 Have mercy only, hear a suppliant's vows,
 For we to thee alone succumb ; and I
 Who Jove and sky and piercing bolt despise
 In reverence thee, O Nereus born, hold ;
 Far worse is thy displeasure than the bolt.
 Of this contempt more patient too I'd be
 If thou would'st *all* avoid. But why dost thou,
 Rejecting Cyclop, Acis love ? And why
 Prefer'st thou Acis to caresses mine ?
 Though please he does and may himself, and thee,—
 Which latter, Galatea, I like not,—
 Let but the chance be given, he will feel
 That strength proportioned to my frame is mine.
 I'll tear his living vitals out and strew
 His mangled limbs o'er plains,—aye, o'er thy waves ;
 So may he mingle his own self with thee !
 For I am all of me consumed with heat ;
 And surges fiercer still the troublous fire ;
 And in this breast of mine I seem to bear
 Translated *Ætna's* self with all its might.
 Nor yet art thou, O Galatea, moved ! ”

In vain complaining thus he rises up,
 (For I saw all,) and like a bull that fumes
 With rage at cow removed, he cannot rest,
 And roams at large in wood and well-known glades.
 When fierce he spies us, me and Acis, crude,
 And dreading nought like this, he roars aloud,
 “ I see, and I'll combine, and may this be
 The final union of your love ! ” That roar
 Was such as furious Cyclop ought to have.
 All *Ætna* with the loud explosion quaked.
 But in the nearing flood aghast I'm merged.
 His back to flight the *Symæthian* hero gave,
 And fleeing said, “ Bring help to me, I pray ;
 Your parents, Galatea, bring, and oh !
 Admit me perishing to your domains ! ”
 The Cyclop follows in hot haste and hurls
 A portion torn from the mount away ;
 And though but it, the mountain's highest peak,
 Fell on him, yet it buried Acis all.

But all that could be lawful done we did,
 That Acis might resume his former strength.
 Volatile juice kept flowing from the mass ;
 And in short time the redness 'gan to fade ;
 And with condensed vapour's early rain
 The hue comes back, and by delay 'tis purged.
 Then fractured gapes the mass ; and live and staunch
 A reed springs through the chinks ; and hollowed face
 Of rock resounds with the impetuous waves.
 And wondrous change ! from mid-waist up straightway
 Stood forth, begirt with waving canes on both
 The new-made horns, a youth who Acis was,
 But greater and in all his aspect green.
 E'en so 'twas Acis pointing seaward still :
 And running brooks have kept the ancient name.

NOTES.

- 1—5 A promontory, favoured by the union of elementary matter and covered with a sparse vegetation, is pictured.
- 1 Acis.—*ἄκίς*, “a point or promontory ;” *Faunus*, *φωνήεις*, “endowed with sound,” as members of the animal kingdom are.
Symæthides, *σύν αἶθω*, “descended in common from igneous sources.” So that Acis would signify a promontory formed from organic and inorganic materials.
- 3 me.—That is Galatea (*γάλα*) “elementary matter,” whether of a solid, fluid, or gaseous nature.
- 6—14 The elementary condition is as eagerly desired by chemical force, as the compound matter of the promontory is by the elements.
- 11 horrendus sylvæ.—Vegetable decay is but a slow form of chemical action.
- 12 impune.—No form of matter can entertain chemical force without imperilling its previous existing form.
- 14 oblitus.—Forgetful of the bodies (*pecorum*) in which it resides, and of the pores (*antrorum*) in these bodies, it longs for elementary change.
- 15—18 The first line is descriptive of chemical force as component and attractive ; the next as endeavouring to rend the bonds that bind it in the compound ; the third and fourth as sundering those bonds, obtaining a short-lived freedom, and again entering into combination.
- 16 The *rigidos* of this line and the *hirsutam* of the next, mark the growth of chemical affinity for other compounds.
- 18 in aqua.—In vapour, the result of harmless explosions, whereby decomposition is carried out.
- 19—28 So far chemical force, whether aerial or submarine, was harmless in effect on the formation of land or on navigation of the sea. But gradually there arose louder and louder reports upon the air that prognosticated either the upheaval of some

Ætna, or renewed energy on the part of some long dormant Ætna, and the atmosphere, as a consequence, grew denser at times.

21 Telemus.—τῆλε ἡμί “far spoken.” Eurymides, “sprung from Eurymus,” εὐρύς ἡμί “wide spoken.”

26 altera.—*forma* is understood. While the seer was speaking a chemical change was taking place.

28 degravat.—The results of the nascent volcano made the atmosphere denser and thus exercised increased pressure on the land; “ingenti passu” denotes the extent of aerial space thus affected.

There is, according to some authorities, a connection between atmospheric pressure and volcanic energy. Stromboli is said to be more active in stormy weather, and Ætna in the winter months.

aut fessus.—There would be intervals of rest every now and again from chemical combinations. So, too, are there intervals of quiescence on the part of active volcanoes.

29—37 An Ætna appears upon the scene, and chemical force proceeds to make it its peculiar home. As time rolls on, changes occur within and without the mountain. Fleecy columns of smoke issue slowly from its pores and crevices; its summit is clothed with brushwood, and its base with heavy forest growth; a main funnel or pipe is established leading from the summit to the fires below.

31 ascendit.—The lava rose to a certain point, and *there* (mediusque resedit) *stopped*, rising and falling with a slow rhythmical movement, as has been observed of the lava in Stromboli and other volcanoes.

32 lanigeræ pecudes.—“Vapour shows itself in the earliest stage of a volcano’s history. Even from volcanoes which, like the Solfatara, near Naples, have been dormant for many centuries, it sometimes still rises without intermission and in considerable volume.”

34 Ante pedes.—The foot or base of the mountain, clothed with forest trees. Each tree, in the volcanic outburst, would act as a club against its fellows.

35 fistula.—The main pipe leading from the crater down to the central fire. A huge volcano, such as Ætna, consists of one or more cones, “and many lateral fissures or pipes from which the heated volcanic products are given out.”

38—58 The poet pictures Elementary Matter as listening mutely to the rumbling notes poured forth from the hundred-passaged pipe of the volcano, and drawing proper conclusions therefrom.

40 Candidior, &c.—Since all compound matter is formed of the elements, the poet feels himself at liberty to predicate of those elements any quality pertaining to compound matter, whether

whiteness, bloom, staunchness, brightness, &c. The regular succession of comparatives in *or* tend to preserve the idea of "rumbling," *sibila*, throughout.

41 *longa*.—Long, in the sense of "lasting," and so applied to the alder, the wood of which is noted for its *firm* grain.

48 *riguo horto*.—"Than a well watered garden," or, as we say, an Eden. The Greek *παράδεισος* is the Latin *riguus hortus*.

59-71 Chemical force continues his roundelay, tells Elementary Matter that if she would but once embrace him, she would be eager to detain him, and proceeds to enumerate the treasures he has in store for her in the mountain, such as volcanic bombs, lava, tuffs, stones, scorix, explosive fissures, vapours and fetid gases.

62 *antra*.—The "pastoria sibila" must be borne in mind, as also the remark that the sounds came from a distance (*procul*) and required much pondering over (*mente notavi*)—chemical force really, as it were, said "nitra," but the rumbling and reverberations made it sound like "antra." The Latin *nitrum* and the Greek *νίτρον* is our own Potassa, or Soda, or a mixture of both, and these enter largely into the composition of rocks in general, as well as into the various kinds of lavas. Hence the words employed by Ovid, "*pars montis, vivo pendentia saxo antra*."

The English word "antre" has been used in the translation from its likeness to *natron* or *anatron*; and, in the same way, an effort has been made to represent the succeeding terms in phonetic English so as to be in consonance with the Latin.

63 *poma*.—The "rumbling" *βωμά* "an elevation," volcanic bombs rounded like an apple or pear-shaped, from a few inches to several feet in diameter, and sometimes solid, sometimes vesicular, sometimes hollow in the centre. Some writers are of opinion that the material of these bombs is in a molten condition like the lava itself, and that when detached and hurled into the air from the surface of the boiling lava, the initial rotatory motion and the expansion of the interstitial vapour, aided by rapid surface cooling, would give them the varying degrees of roundness as to shape, and their internal structure.

The likeness between *poma* and *πῶμα* "a lid, cover," suggests that Ovid held the theory of their being more or less solidified matter that acted as covers or lids over the molten lava filling the larger branching passages (*ramos*)—the term *gravantia* supports the idea. It is well to note that when a volcano is inactive for any length of time, the cavity of the crater is found to be shut up with a solid crust of lava.

64 *uvæ*.—The "juicy or grapy" lava. The radical idea of both *lava* and *uva*, as seen in *lavo* and *uveo*, is "liquid, or flowing," and

the likeness between alluvies, diluvies, and uvæ, recommended itself to the poet in his choice of words.

Lavas vary in colour ; the less dense are buff or pale yellow (*auro similes*), while the heavier lavas are dark gray or almost black (*purpurece*).

vitibus—While keeping up the simile he chooses a word resembling itibus (itus) “passages.” The *vitibus* refer to the minor passages, *ramos* to the main pipes.

The poet is not singular in taking a tree, its branches, and fruit for a simile. So staid a writer as Lyell has done the same when comparing the volcanic products with the trap rocks: “the external cone with its loose ashes and porous lava may be likened to the light foliage and branches, and the rocks concealed far below to the roots.”

66 *silvestri nata*, &c.—*Silvestris* and *silva* are the equivalents of the Greek *ἰλαίος* and *ἵλη*, the latter of which is used in Greek to denote *matter* in general. “Produced subsequent to matter’s shade,” says the Cyclop of Galatea—for elementary matter, as we have seen, was preceded by the Gæa over which the *σκόρος* was.

67 *molliā fraga*.—The usual similitude is kept up, *fraga* being *fracta*, such *soft (molliā) fragmentary* materials as dust, ashes, sand, &c., included under the general names of tuffs. All these are thrown up in immense quantities and are often turned into mud by the volume of condensed steam falling upon them in showers of rain. It was principally by such fragmentary materials and mud, and not by lava, that Pompeii and Herculaneum were buried.

Soft mud itself, too, often issues in vast quantities from volcanic reservoirs, forming what are called mud lavas that are equal in point of extent and destructiveness to the igneous ones. In 1698, torrents of mud from Carguara, one of the Andes, covered an area of four square leagues. A similar outpouring in Java buried a large extent of territory to a depth of 100 feet.

cornea.—Other fragmentary volcanic products, but larger and ranging from the size of a pea to that of a walnut, are called *lapilli*. Still others are *tufaceous conglomerates*, or rolled pebbles cemented together with tuff.

The poet likens both these to cornels, red berries having a hard kernel in the middle; and as the showers of stones and cinders continue *longer or later* than the flow of lava, the word “autumnalia,” “later in the season, or the fall,” is added to *cornea* and *pruna*.

68 *pruna*.—A third class of fragmentary materials is composed of scoriaeous matter, such as cinders, slag, pumice, all of which are more or less *porous*, or *honey-combed*. As they are usually of a reddish-brown, gray, or black hue, they are styled *liventia*. *Nigro succo*, “false juice,” denotes the dryness of the *scoriæ*,

niger being used as we use it in such terms as "black galena" for false galena, "black-lead" for a mineral containing no lead, "black oak" for barren oak, and so on.

Pruna in Latin signifies also "a live coal, a hot cinder," and hence the selection of the word by Ovid.

"No part of the operations of a volcano has greater geological significance than the ejection of such enormous quantities of fragmentary matter. As every shower of dust and sand adds to the height of the ground on which it falls, thick volcanic accumulations may be formed far beyond the base of the mountain. In these are entangled trees and other kinds of vegetation, together with the bodies of many animals, as well as the works of man. Hence new geological formations arise." All this is expressed by the poet's prefacing words, "*ipsa tuis manibus leges.*"

70 *castaneæ*.—*χάστροι*, "gapings, clefts, fissures, rents of all kinds," caused originally at the focus of action, and thence spreading and intersecting in all directions. These are always present (*nec deerunt*) in greater or less numbers for all active volcanoes.

71 *arbuti*.—Another constant and important attendant of volcanoes are *gases and vapours*: "they show themselves in the earliest stages of a volcano's history, and continue to appear for centuries after all other evidences of subterranean action have ceased." Mixed with the steam are such acrid gases as sulphuretted hydrogen, sulphuric, carbonic, and hydrochloric acids. These are denoted by "*arbuti foetus*," "*arbutus growths*"; the *arbutus* being noted for the *acidity* of its fruit. It is well also to note the closeness between *foetus* and *fetidus*.

arbos.—*ἀβρός* "simple": "everything simple will serve thee." The *pastoria sibila* make it sound like *arbos*, just as "*shrub*" sounds like "*shruff*," metallic dross.

72-77 The stock enumerated is peculiarly volcanic. But besides this, chemical changes are constantly taking place in innumerable ways amid the carbon compounds of animal and vegetable life.

73 *in antris*.—Not alone the beasts and reptiles and creeping things that dwell therein, but also such chemical denizens as choke-damp, fire-damp, &c.

74 *quot sint*.—The list of organic compounds is as endless as it is wonderful.

77 *distentum uber*.—Equally remarkable with their multitude is the *number of atoms* that organic substances contain. While inorganic bodies are simple in construction and contain but a few atoms, the organic are extremely complex, and contain a large number. Thus, such *large-atomed molecules* (*distentum uber*) as sugar, stearine, and albumen, contain respectively 45, 173, and 222, if not more, atoms.

78-81 Still other treasures has chemical force in the boiling and

thermal springs, and in the gas, oil, and mineral springs of all kinds.

78 tepidis, &c.—The geysers and thermal springers (agni) of the world: though powerful in their way they are still inferior (*factura minor*) to volcanic energy.

79 hædi.—Carbonic acid, carburetted hydrogen, naphtha, petroleum, chalybeate, sulphur, and other springs: in point of time they are coeval (*par ætas*) with the thermal.

80 lac, &c.—The steam, gas, oil, and water, spouting from these “springers” are of a white or light straw colour.

pars bibenda.—The Baïæ of old, and in our own day, certain springs, such as Vichy and Saratoga, Bath, Kissingen, Wiesbaden, and numerous others, are resorted to for the purpose of *drinking their medicinal waters*.

81 coagula durant.—The hot water of the geysers and thermal springs is rich in silica, which, on cooling and evaporating, is *hardened and deposited round their basins*. One such bed in the geyser regions of Iceland is about six miles long, one mile wide, and 100 feet thick. The same process of hardened deposition goes on round other springs, producing coagulated masses of sulphur, salt, lime, &c.

82-90 As special gifts to Elementary Matter, and ones with which she can play and sport to her heart's content, there are promised Magnetism and Electricity.

85 geminos.—Magnetism and Electricity, convertible one into the other, and so like to one another in many well-known respects that Ovid calls them “*geminos inter se similes vix ut dignoscere possis*.”

The globe is a vast magnet and the common reservoir of electricity.

87 villosæ ursæ.—Magnetism and Electricity are *polar forces*, and this is denoted by calling them the “cubs of the white, that is, the polar bear, dwelling on the furthest mounts.”

88 inveni.—Electricity and Magnetism are intimately connected with chemical force, and it is a general law that no chemical action can occur without producing electrical disturbance of some kind, even though such disturbance be inappreciable. That volcanic outbursts are accompanied by electric and magnetic changes is evidenced by the lightning that frequently accompanies the eruptions, and by variations observed in the magnetic needle.

91-109 Chemical force passes on to a personal description of itself.

92 liquidæ aquæ.—Of steam or vapour.

93 Adspice.—“Behold!” and a mighty volume of steam and smoke shot heavenwards,—for the denouement was approaching.

hoc corpore.—Life (Jupiter) is organised matter, and organised matter is but substance (*corpus*).

- 95 coma.—The *tangled brushwood* on the mountain's head or summit, and the heavier growth of vegetation (*lucus*) lower down (*humeros*). Previous to 79 A.D. the crater of Vesuvius "was a wilderness of wild vines and brushwood," and again during its quiescence previous to the outburst of 1631, "the crater had once more become choked with copsewood."
- 105 genitor.—Each element has its equivalent number, with which or a multiple of which it combines with other elements to form compounds. In the relative scale generally adopted, Hydrogen, owing to its superior lightness and diffusive power and to its combining in the smallest proportions of any element, is chosen for the base or 1. As this Equivalent Notation is all essential to Chemistry, and as *Hydrogen is the foundation* on which Equivalence rests, Ovid describes Chemical force as claiming Hydrogen for the founder of its race or being, the same Hydrogen that, as its name denotes, rules in water, H_2O .
- The line, as bearing on *Equivalence*, is thus as remarkable in its way as that of Homer's pointing to chemical *reaction*.
- 106 hunc socerum.—Hydrogen, an element itself and the lightest of all others, is surely the *lawful parent*, or father-in-law of Elementary Matter.
- 109 Nerei.—Nereus literally means "not changed, unchangeable" ($\nu\eta\ \rho\acute{\epsilon}\omega$). Compound bodies are always undergoing changes; it is only the elements that are unchangeable or constant—so that *Nereis* means "born of the unchangeable," that is, *Elementary matter*.
- 110-120 The rumblings are growing louder, and denser go up the smoke and steam. Each succeeding moment is now threatening of a terrible eruption.
- 117 Spargam, &c.—Lava streams have protruded into the sea in many instances. In 1794, one from Vesuvius entered the Mediterranean to a distance outwards of 360 feet, with a breadth of 1,100 and a height of 15 feet.
- 118 uror.—The volcanic crisis is at hand.
- 119 translata *Ætnam*.—Byron has evolved a similar idea :

"The cold in clime are cold in blood,
 Their love can scarce deserve the name;
 But mine was like the lava flood
 That boils in *Ætna's* breast of flame."

- 121-135 The following description of an outburst of Vesuvius will help to bring before the mind's eye much of what has preceded and the pith of what is to come :

"Frequent indications of an approaching outburst are conveyed by sympathetic movements of the ground beneath. Rumblings and groanings from a subterranean source are heard; slight tremors succeed, increasing in frequency and

violence till they become distinct earthquake shocks. The vapours from the crater rise more abundantly into the air. All this time the lava column in the pipe or funnel of the volcano has been slowly ascending, forced upward and kept in perpetual agitation by the passage of the elastic vapours through its mass. If a long previous interval of quiescence has elapsed there may be much solidified lava towards the top of the vent which will restrain the ascent of the still molten portion underneath.

"A vast pressure is thus exercised on the sides of the cone. Should these be too weak to resist, they will open in one or more rents, and the liquid lava will issue from the outer slope of the mountain; or the energies of the volcano will be directed towards clearing the obstruction in the chief throat, until, with tremendous explosions, and the rise of a vast cloud of dust and fragments, the bottom and sides of the crater are finally blown out, and the top of the cone disappears. The lava may now escape from the lowest part of the lip of the crater, while, at the same time, immense numbers of red-hot bombs, scorix, and stones are shot up into the air, most of them falling back into the crater, but many descending upon the outer slopes of the cone, and some even upon the country beyond the base of the mountain.

"The lava rushes down at first like one or more rivers of melted iron, but, as it cools, its rate of motion lessens."

122 Surgit.—The lava.

123 errat.—From the numerous fissures in the mountain's side.

Often more than not, especially in lofty volcanoes, the lava issues at first from these fissures.

124 ignaros.—But sparsely clothed with vegetation, immature.

Our use of "green" in the sense of raw, unripe, crude, points to *ignarus* as its derivation.

125 video.—The explosion (*exclamat*) comes at last: molecular matter is disrupted by the mighty convulsion, the imprisoned steam gets free, and Chemical force shouts out "video!"

126 faciam.—To make is to combine.

129 ast ego mergor.—The aqueous vapour, with which lava is abundantly charged even when emitted, escapes at once as a dense white cloud of steam that hangs over and advances in line with the moving lava torrent.

130 terga fugæ.—The tremors and earthquake shocks would cause an undulating motion through the surface or back of the promontory.

133 insequitur.—The lava from Mauna Loa in 1852 travelled 15 miles in two hours; that from Vesuvius in 1805 went nearly 4 miles in the first four minutes.

134 Extremus angulus.—The entire *summit*, or furthest angle of the

mountain, was blown out and scattered in fragments over the doomed promontory.

Antuco, in Chili, has hurled stones to a distance of 36 miles, and Cotopaxi has hurled a 200-ton block nine miles. In 1538 an eruption of Vesuvius formed a hill 440 feet high and a mile and a-half in circumference, from the stones, scoræ, and ashes ejected.

- 136—148 The outburst is over. Centuries of quiescence ensue during which the loving elements of air and water are at work cooling the lava, changing its hue from glowing red to black, and causing it to assume a cindery aspect. Rents and fissures appear over the whole surface; it finally crumbles down to a soil excellently fitted for a luxuriant vegetation; and once more a promontory, the same Acis and yet not the same, is beheld jutting into the sea, encircled with rushes and aquatic plants, and decked all over with verdant grass and shrubs.
- 138 *puniceus*.—"Carthaginian," that is, not to be depended on, volatile, *puniceus cruor*, "volatile moisture," or *steam and imprisoned gases*. After the lava has escaped and flowed over, it continues to exhale steam from every point of its surface. Here and there, too, fissures, or fumaroles as they are called, are formed whence issue the more liquid lava underneath, columns of hissing steam and gaseous vapours of several kinds.
- 140 *fluminis*.—The *aqueous vapour* of the atmosphere, the mythological symbol for which is *Oceanus*, which has in turn been described as a *river* surrounding the entire globe.
- 141 *purgatur*.—The lava bed is rendered porous or cindery.
- 143 *Os cavum*.—A cove or inlet is formed by the sea in front of the promontory so as to give it a crescentic or horned appearance, as mentioned later (*nova cornua*).
- 146 *major*.—The lava that had projected into the sea helped to make the new promontory larger than it was before the eruption.
- 147 *amnem*.—The word means not only "a river," but also "the sea, the ocean," and is so used by Tibullus in the line "*solis anhelantes abluet amnis equos*."
- 148 *nomen*.—Acis, in some form or other, is a favourite name for rivers, as directing their course into the sea; thus, *Acalandrus*, *Acampsis*, *Aces*, *Acis*, *Acesines*, *Achardeus*, *Achates*, *Achelous*, *Acheron*, &c.

CHAPTER VI.

GREAT PHYSICAL FORCES.

Hecatoncheires.—In scientific language there is a marked relationship between Matter, Chemical force, and the Physical forces: in mythological language there is the same relationship between the Titans, Cyclopes, and Hecatoncheires. If, then, we accept the identity of the Titans and Cyclopes with molecular matter and chemical force, it is only natural to infer that the Physical forces are symbolised by the Hecatoncheires.

With the coming of molecular matter there would also come what are called the Universal properties of matter, and these, though variously subdivided, may be reduced to three, namely, Extension, Impenetrability, and Attraction. These are the only observable forces that can be appreciated when we gaze upon infant matter, or the nebulæ, through the most powerful telescope.

We behold them isolated in space, and are conscious of some mighty force that has been and is at work shaping and governing their extent from the wholly irregular to elongated, spiral, annular, circular, elliptical, and other forms. We call this extension-ruling force *Figure*.

We look again and see these nebulous masses going through all degrees of condensation, and are conscious of another mighty force that has been and is separating the mass into fissures, nuclei, rings, convolutions, globular clusters, star balls, and stars. We call this system-making force *Divisibility*, one that rules impenetrability with as iron a rod as *Figure* rules extension.

Once more we look, and are mentally conscious of a third force, as mighty as if not mightier than its fellows,

which sways the attraction of atom for atom, molecule for molecule, and mass for mass. This attraction-ruling force we call *Gravity* or *Gravitation*.

And not alone in those most distant nebulae are Figure, Divisibility, and Gravitation present: they are equally potent in every star, sun, and planet, earth included, that compose the universe. The particle of aqueous vapour that is divided from the cloud, shaped into a rain drop, and attracted to the earth, is as subject to the influences of those mighty three as is the Earth itself, separate in place, rounded in form, and bound by attraction to its orbit. The stars in our visible universe must be calculated by hundreds of millions as to number, by billions of miles as to distance, and most of them by multiples of our sun as to volume. Even so, the hands of Gravitation, of Figure, and Divisibility are long enough and numerous enough to grasp them all, to bind them as a whole, to shape their ends, and measure out the amount of space allotted to their bulk and to their paths in ether.

Can the mind conceive or desire more mighty forces than these? We call them *Universal* or *far-reaching*: Mythology has styled them *Hecatoncheires* or *hundred-handed*. The sounds are different, but the idea is identical.

The same doubt existing as to precedency in their order of being as a whole is noticeable in them individually, for while Hesiod introduces them as Cottus, Briareus, and Gyes, Apollodorus mentions them in the order of Briareus, Gyes, and Cottus. It would seem as if the primordial agencies in the evolution of a nebulous universe presented themselves to the mind of the more ancient writer in the sequence of Differentiation as to space, Traction towards a common centre, and Shape more or less specified; while to Apollodorus the order of evolution would be Traction, Shape, and finally Division. Those scientists who favour the throwing off of successive rings from the parent mass to form our system would appear to have Apollodorus on their side; while those who, like Faye, argue for the establishment of our system, not by the formation of rings

but by local condensations within the nebula, can claim Hesiod as an authority.

Let us examine those Hecatoncheires separately.

Briareus (Βριάρεως), whether derived directly from βάρος "weight, gravity," or from βρι-ἄρω, "well or mightily joined," is evidently that greatest form of attraction called Gravitation. We see the idea of "weight" and "gravity" running too plainly through such cognates as βαρύς, βρίθω, βριάω, and others, to permit of any doubt as to the intent of the appellation. His other name, Ægæon (Αἰγαίων), is seen by the derivation, αἶα γαίῳν, to signify "the exultation or strong desire of earth," and denotes the downward pressure of a body in its tendency to seek the centre of the earth. It is thus synonymous with, and indeed the true derivation of our word "weight." So that when Homer says "Whom gods Briareus, men Ægæon call," he simply distinguishes, as we do ourselves, between the learned and the common usages of Gravitation and Weight, and formulated the dictum of modern science, "this force which on the earth exerts itself as gravity acts in the heavenly spaces as gravitation." It is probably too, to distinguish between gravitation as affecting the heavenly bodies, and mere terrestrial gravity, that the latter (as the more important for earth), has been written by some writers 'Ο βριάρεως, the ὁ being emphatic.

The influence that Gravitation exerts on the tides, causing the waters of our oceans to ebb and flow and preventing them from falling off the surface of the globe, is not lost sight of in the myths; for the battle of the Titans being finished, Hesiod thus concludes :

Βριάρεων γέ μὲν ἦν ἔοντα
γαμβρὸν ἐὼν ποίησε βαρύκτυπος Ἐννοσίγαιος,
δῶκε δὲ Κυμοπόλειαν ὀπυίειν, θυγατέρα ἦν.

Theog. 817—819.

The loud-resounding one that shakes the earth
Attached in ties of kin Briareus famed,
And gave him Moving Wave, his child, to wed.

Time and again during the many epochs of our earth's existence have the convulsive movements of the crust and

overwhelming onsets of the sea shattered and submerged whole continents and threatened the very existence of life itself upon our globe. Time and again have the organised structures themselves preyed upon their fellows, exterminated whole colonies, and helped in no little measure to fetter the life that gave them being. Still, during all, Gravitation was there with its hundred hands; Gravity was there with overwhelming might, to keep our orb ever secure in its daily and yearly round and to check the rebel passions of the deep; and just as long as it continues to put forth its powers, so long will Life and the law that life stands for continue to be triumphant over the seismic convulsions of the land, the onsets of the sea, and the destruction of organised beings by natural decay or an untimely end.

A great truth this, vouched for by time and the teachings of the rocks; so great and undoubted a truth that we find it incorporated into the myths and thus immortalised by Homer.

- Πολλάκι γὰρ σέο πατὴρ ἐνὶ μεγάροισιν ἄκουσα
 εὐχομένης, ὅτ' ἔφησθο κελαινεφέϊ Κρονίῳ
 οἷή ἐν ἀθανάτοισιν ἀεικέα λοιγὸν ἀμῦναι,
 ὁππότε μιν ξυνδῆσαι Ὀλύμπιοι ἤθελον ἄλλοι,
 5 Ἥρῃ τ', ἥδ' Ἐποσειδάων, καὶ Παλλὰς Ἀθήνῃ.
 Ἄλλὰ σὺ τὸν γ' ἐλθοῦσα, θεὰ, ὑπελύσαο δεσμῶν,
 ὧχ' Ἑκατόγχειρον καλέσας ἔς μακρὸν Ὀλυμπον,
 ὃν Βριάρεων καλέουσι θεοὶ, ἄνδρες δέ τε πάντες
 Αἰγαίων· ὃ γὰρ αὖτε βίῃ οὗ πατὴρ ἀμείνων·
 10 οὗς ῥα παρὰ Κρονίῳ καθέζετο, κύδει γαίων.
 Τὸν καὶ ὑπέδδεισαν μάκαρες θεοὶ, οὐδ' ἔτ' ἔδῃσαν.

Iliad I. 396—406.

For oft I've heard thee in my father's halls
 Relate with pride how you, the only one
 Among immortals, showed the cloud-clad son
 Of Saturn how to ward untimely wreck
 When erst those other gods would fetter him,
 Both Juno, Neptune, and Minerva too.
 But you arriving loosed the bonds below,
 Having, O Goddess, summoned with despatch
 To wide Olympus him with hundred hands
 Whom gods Briareus, men Ægeon call,

(For one, inversely in his native strength,
Superior is); who then his station took,
With glory swelling, near to Saturn's son.
From him in fear the over-joyous gods
Shrank back, and thought of binding had they not.

NOTES.

- 5 Ἥρη, &c.—Juno is the mythical symbol for *the land*, Neptune for *the sea*, and Minerva for *organised force*.
- 6 οὐ θεὰ—Thetis. When land and sea and organised force break bounds, as they have done in the past, all life and nature are threatened for a while. But at last there comes the *natural order* of things (Thetis—*τίθημι*), that, aided by the mere presence of gravitation, brings back order from confusion. For this reason, too, is Thetis said to have “loosed the bonds *below*,” as it is on the surface that peace and order begin.
- 9 ὁ γὰρ αὐτε, &c.—The ὁ refers evidently to Briareus or Gravitation, as opposed to Ægæon or Gravity. αὐτε means “contrariwise, conversely, or *inversely*.” So that the whole line is explanatory of the great scientific truth with regard to Gravitation and its law. We shall find additional evidence in the description of the Hecatoncheires given by Hesiod.
- 11 ἐπέδδυσαν—The convulsed earth and sea, and organised violence, shrank back to their original and orderly positions under the influence of Gravitation and Gravity.

Gyes (Γύης) is certainly related to γυῖον, “a limb,” that is, the extremity of anything whereby it is limited or shaped. The connection is well denoted in a line of Prior's:—

“Grace shaped her limbs and beauty decked her face.”

We can trace the Greek word in the Latin *figura*, more plainly in the English “*guise*,” and can detect a corresponding relationship between “limb” and “limn” similar to that between γυῖον and Γύης. That the real derivation of the word is γῡα or γύης, “tilled land, the womb,” receives much confirmation from the use in English of the words “*mould*, to fashion, to shape,” and of *mould*, “the matrix or womb in which anything is cast and receives its form.”

The word is thus by both derivation and kin synonymous with *Figure* or *Shape*, the force that has given their outlines to the continents, oceans, and organisms of Earth, to

our own and other systems, to the cosmopolitan comets, to Sirius and Aldebaran, to the Universe as a whole. Chemical changes are not under his jurisdiction, for such belong to his Cyclopean brethren. But all physical changes acknowledge the sway of Gyes ; for while water remains water, whether as ice, rain, or vapour,—while woody fibre remains the same, whether in the plant, the tree, or girder,—while each element retains its individual nature, be it solid, fluid, or gaseous,—they are all under the power of Gyes. Let them be transformed as they are again, again, and again, this master Figure draws circumscribing lines around them.

“There’s a divinity that shapes our ends,
Rough-hew them how we will.”

Horace alludes to Figure in his Odes. Reproaching Mæcenæ for his nervous fears, and prophetically declaring that their destinies for weal or woe are too closely connected for any separation in this world or the next, he says :—

Ibimus, ibimus,
Utcunque præcedes, supremum
Carpere iter comites parati.
Me nec Chimæaræ spiritus igneæ,
Nec si resurgat centimanus Gyas,
Divellet unquam.

Car. II. 17.

Prepared to enter on that journey last,
Like comrades marching, marching shall we go ;
Thou first may be :
Not me Chimæara’s all-consuming blast,
Not me the resurrected Gyes vast,
Shall bar from thee.

The poet evidently means that no extreme of heat (chimæra), not even boundless space, or the universal and unshapen mass that existed when Gyes came into being, could separate the spiritual affinity between his patron and himself.

Cottus.—If there be, as is generally supposed, but one force from which all others are evolved, then there must have been a time when gravitation, figure, and divisibility,

—three distinct forms of force,—did not exist, and when consequently there was an absence of attraction, extension, and impenetrability. This state of things can only apply to the very earliest stage of the nebula, when Gæa had not yet borne molecular children, the Titans, to Uranus; to that tantalizing era of existence when simple apprehension is the only refuge for intelligence; when we are forced to consider the Universe as a point, and matter as composed of indivisible atoms. Mathematics throws up its hands at a “point,” chemistry at an “atom.”

But in whatever way or fashion indivisible matter was compelled to become divisible, we must take it for granted that such really did occur, that the theoretical atoms of the nebulous age were evolved later on into the practical molecules, that matter capable of being divided or cut made its appearance, that *Divisibility*—the mythological *Cottus* (Κόττος, κόπτω, “to cut, divide”) was born.

Not often is he alluded to in the myths; yet there is one part in the battle of the Titans where he is appropriately made by Hesiod to speak for himself and brothers in reply to Jupiter’s appeal for help. But the very name is suggestive and all-sufficient. When we look at the myriads of stars and reflect that once they were all united in the one nebulous mass, we are conscious of a Cottus who has used his falchion wondrous well and wise. When we come to earth and find that a single grain of copper can by solution be divided into a hundred million parts, that a drop of blood contains one hundred and twenty millions of globules, and that an ounce of gold can be drawn out to 432 thousand million parts, we are struck with the vast power of this dividing Cottus. Amazement comes to a climax when we are told that one cubic inch of tripoli consists of the fossil shells of animalcules each of which is but the 41 thousand millionth of that cubic inch; and yet each of these was once alive, and presumably in possession of limbs and internal organs through which nourishment was taken and fluids circulated!

Distinctive epithets have been assigned by Hesiod to

each of the Hecatoncheires, *μεγάθυμος*, "the strong-spirited," to the attractive Briareus; *ἄατος πολέμοιο*, "the insatiable for strife," to the ever-changing Gyes; and *ἀμύμων* to Cottus. The derivation of this *ἀμύμων* is most probably a negative and *μύω*, "to close, to keep close,"—especially as applied to the lips and eyes. While this does not interfere with the accepted rendering, "blameless, irreproachable," in as much as a person so gifted is "one who need not close his lips or eyes through shame," it must be taken literally in the case of Cottus as "*not keeping close*," that is *dividing*, or the *complex process* whereby Evolution is advanced.

Hesiod's description of the Hecatoncheires runs thus :

- 1 ἄλλοι δ' αὖ Γαίης τε καὶ Οὐρανοῦ ἐξεγένοντο
 τρεῖς παῖδες μεγάλοι τε καὶ ὄβριμοι, οὐκ ὀνομαστοί,
 Κόττος τε Βριάρεώς τε Γύης θ', ὑπερήφανα τέκνα.
 τῶν ἑκατὸν μὲν χεῖρες ἀπ' ὤμων αἰσσοῦντο
 5 ἄπλαστοι, κεφαλαὶ δὲ ἐκάστω πεντήκοντα
 ἐξ ὤμων ἐπέφυκον ἐπὶ στιβαροῖσι μέλεσσιν.
 ἰσχυρὸς δ' ἄπλητος κρατερὴν μεγάλῃ ἐπὶ εἶδει.

Theog. 147.

From Ge and Uranus were also sprung
 Three other sons, children known far and wide,
 Both great and strong beyond description's bounds,
 Cottus and Gyes and Briareus.
 'Way from the shoulders hundred hands there flashed
 Proportioned not; from fifty shoulders grew,
 Anent the well-squared members, heads for each.
 And more than great upon a mighty form
 Was their exceedingly surpassing force.

NOTES.

- 3 *ὑπερήφανα*—That is "universal."
 5 *ἄπλαστοι*—a *πλαστός* "not shaped, out of proportion."
 6 *ἐπέφυκον*—Literally "were made to grow."
στιβαροῖσι—"close pressed, compact," as anything is when *square*.
 Thus "a gate close shut" is a gate that closes square, and
 a "square of soldiery" is a *compact* body of men.

The three lines commencing with "*τῶν ἑκατὸν μὲν χεῖρες*" are of astounding importance in as much as they contain the formula for the great law of Gravitation. The law is, "Attraction is inversely as the squares of the distances."

Thus, if we represent the respective distances by x and y , the known attraction of x by a , and that required of y by b ; the proportion will be, not in the direct ratio of x to y , but inversely as their squares, as follows :

$$y^2 : x^2 \quad :: \quad a : b$$

To explain this is the poet's task, and he does it thus :

He regards the ratio sign ($:$) as "shoulders"; the respective distances (x and y) as "hands" shooting away from those shoulders; and the measures of attraction (a and b) as "heads" lying opposite to the squared members of the proportion. As those last run in the order of $50^2:50^2$, $49^2:51^2$, $48^2:52^2$, $47^2:53^2$, and so on, in sums always of 100, till we get to the last combination or $1^2:99^2$, and as there are just 50 of those combinations, there would consequently be 50 "heads," *made to grow* in a ratio proportional to that of the inverse squares.

For ingenuity and vividness the lines are probably without a parallel. Let us take them as they run, and we actually see *the proportion growing under our very eyes*, and *Gravitation's law evolving with the growth* :

τῶν ἀπ' ὧμων	:
ἐκατὸν μὲν χεῖρες αἰσσοῦντο ἀπλαστοὶ . . .	$y : x$
δὲ πεντήκοντα ἐξ ὧμων	$y : x$
	&c. &c.
ἐπὶ στιβαροῖσι μέλεσσιν	$y^2 : x^2$
κεφαλὰὶ ἐκάστω ἐπέφυκον	$y^2 : x^2 :: a : b$

It is possible then, however the knowledge was lost up to the time when Newton re-discovered it, that Gravitation and the law governing it were well-known to the ancients, as far back at least as the days of Hesiod. We have already pointed out a line in the Iliad showing that Homer was also acquainted with the law, and it may be remarked here that the words of the succeeding line, "*κύδει γαῖων*," are worthy of thought and inspection from the strong resemblance between *κύδος* and *κύβος*, "a solid square," as also between *κυδρός* and the Latin *quadra*. That the knowledge survived among the well-informed up to the time of the Augustan

Era appears more than probable from this passage in the Æneid :—

Centaury in foribus stabulant, Scyllæque biformes,
Et centum geminus Briareus.

To translate geminus as “handed,” with *ge* as merely euphonic, has no authority whatsoever and is simply an ipse dixit of some commentator. If we render centum geminus literally, it will be “hundred double,” that is “a hundred squared” or “the centuple Briareus,” a meaning that brings it into consonance with gravitation and its law.

CHAPTER VII.

THE FIXED CUT-OFF.

Uranus.—Our earth is, roughly speaking, 8,000 miles in diameter. As it is somewhat over $2\frac{1}{2}$ billions of miles distant from Neptune, it would take over 300,000 of our earths to reach the boundary of our system. Again, the diameter of this solar system is about six billions of miles. Yet, it would take over four such systems in a straight line to reach the nearest fixed star, α Centauri; over eight of them to reach Sirius which is but the fourth nearest to us; over 33 to arrive at Capella; 200 to get to Arcturus; and over 45,000 of our Solar systems to stretch to Algol! Yet, all these and myriads like them, thousands of others too far to have their distances computed, and other thousands too far to be even discerned by telescope yet made, form our universe and must be supposed as at one far distant time composing that aggregated mass of which mention has so frequently been made. And enormous though these figures be, and however vast the diameter—if we knew it—of our universe, the mind must still go on and compare it too with the other universes of infinite space, just as we compared Earth with its system, and our system with its universe.

What does all this imply? This; that, though humanly speaking, it, our universe, was the $\tau\acute{o}\ \pi\acute{\alpha}\nu$, it was nevertheless *finite*, and lack of infinity implies the presence of a *boundary*, or of that which gives *form* to the collective universe. Expand as it would, and contract as it might in order to gain additional distention, the limit had been assigned beyond which there was no thoroughfare for the Nebula.

What was this boundary? When was it formed? What its nature? How was it produced?

Answer to these questions must necessarily be vague; still, answer there is some.

It was the "firmament" called Uranus or Heaven, according to Genesis, "dividing the waters from the waters:" it was the "Uranus" cut off by Kronos, as related in the myths: it was the "limitary boundary" of our universe, separating it from external universes, as expounded by Science.

According to Genesis it was the work of the Second Day. It was thus subsequent to the time when "the Earth was without form and void: and darkness upon the face of the deep," and to a Day when God said, "Let there be light: and there was light." According to Mythology, it was formed subsequently to Chaos, Erebus, and Nox, to Æther and Hemera. Science has no date or landmark for the event.

As to the nature of this firmament much has been said, but only conjecturally. Scripture leads us to infer that it was such as could divide and *keep divided* the waters above it from those under it, for whatever change may have occurred in time to alter the waters under it, we have for those above it the words of Psalm cxlviii. 4: "Praise Him, ye heavens of heavens, and ye waters that be above the heavens." Most of the epithets applied to it in the classics are more significative of height, clearness, convexity, splendour, colour, and stelligerence, than they are of material nature. The Greek poets, Homer frequently, make use of *χάλκεος* and *σιδήρεος* in connection with it, just as we speak of the "brazen vault" and "golden gates;" and in Job xxxvii. 18, we find, "Hast thou with Him spread out the sky which is strong, and as a molten looking-glass?"

The scholastics, as a rule, were of opinion that it resembled elementary matter in being corporeal, inanimate, and simple, but maintained that, while the matter of the elements was corruptible and capable of three forms, solid, fluid, and gaseous, the matter of the firmament was incorruptible, and consisted of a fourth form, or one that was neither solid, fluid, nor gaseous. This, in a sense, is in accordance with Mythology. Hesiod, as already seen, says:—

And firstly then did Gæ indeed produce
Like to herself the starry Uranus.

We are thus led to suppose that, whatever was the nature and whatever were the constituents of the primal mass when disrupted from the Chaos, the firmament possessed the same, and that it went in all likelihood through the same changes in composition that Gæa did, until such time as it was made an independent existence. It would, as a consequence, range in material nature from the extreme of pure atomic to that of pure molecular matter, and as the all-penetrating Ether or light of the Empyrean had to traverse it, the old epithet of "Crystalline Sphere" must be looked on with respect. In view of what we know to-day regarding the Roentgen or so-called X-rays, the firmament may be other than Crystalline and still be capable of transmitting light. Helmholtz adumbrates the idea of a material firmament when he says, "It (solar heat) has proceeded outwards, and daily proceeds outwards into infinite space; and we know not whether the medium which transmits the undulations of light and heat possesses an end where the rays must return, or whether they eternally pursue their way through infinitude." Whatever it may be, whether material and capable of reflecting force and the forces evolved from this force, or an unsubstantial vault, but beyond which no force or material component of our universe dare swerve by a hair's breadth, is kept from human knowledge so far. All we know about it from the united testimony of Scripture, Science, and Mythology points conclusively to its existence, favourably to its being of a material form, but negatively as to the nature of the matter.

As to the manner of its formation, the Genesiac narrative runs thus:—

- 6 Καὶ εἶπεν ὁ Θεὸς, Γενηθήτω στερέωμα ἐν μέσῳ τοῦ ὕδατος· καὶ ἔστω διαχωρίζον ἀνὰ μέσον ὕδατος καὶ ὕδατος· καὶ ἐγένετο οὕτως.
- 7 Καὶ ἐποίησεν ὁ Θεὸς τὸ στερέωμα· καὶ διεχώρισεν ὁ Θεὸς ἀνὰ μέσον τοῦ ὕδατος, ὃ ἦν ὑποκάτω τοῦ στερεώματος, καὶ ἀνὰ μέσον τοῦ ὕδατος, τοῦ ἐπάνω τοῦ στερεώματος.
- 8 Καὶ ἐκάλεσεν ὁ Θεὸς τὸ στερέωμα, 'Ουρανόν· καὶ εἶδεν ὁ Θεὸς, ὅτι καλόν· καὶ ἐγένετο ἑσπέρα, καὶ ἐγένετο πρωΐ, ἡμέρα δευτέρα.

This literally rendered would read :—

6. And God said, Let there be a firmament in the midst of the water: and let there be a division through the midst of water and of water: and it was so.

7. And God made the firmament: and God made a division through the midst of the water, the which was under the firmament, and through the midst of the water, that above the firmament.

8. And God called the firmament Heaven: and God saw that it was good: and there was evening, and there was morning, the second day.

Those verses are certainly not opposed to the theory of "Heavens of Heavens" or external universes; on the contrary they are rather favourable. Another point in connection with them must be borne in mind. Many of the Fathers and Theologians, notably St. Augustine, distinguish between the *opus creationis* and the *opus formationis*, and consider the evolvment of the physical universe indirectly, or through the agency of natural causes,—derivative creation,—as not opposed to the text of Scripture, and as being more reasonable. In the work of the Six Days Genesis states the fiat of the Creator and the accomplishment of the fiat. This, with the regular order or succession of creative formations, is deemed sufficient by its author, considering the main point he had in view,—an Omnipotent and Beneficent Deity. The subsidiary means and length of time occupied in each individual formation were but of secondary importance in his estimation and outside the religious scope of his work. He was satisfied with enunciating truths: science might or might not work out the details.

Science *has* grappled the task, and applying the ancillaries of the Nebular Hypothesis, Condensation, Alteration, and Liberation, argues thus: Let condensation be permitted to occur in the universal nebula, let alterations take place in the nature of the matter resident therein, and let there be liberation of the physical and chemical forces which have sprung up: let all these act in time, and disruption would occur whereby a firmament, such as is mentioned, would be formed, acting as a boundary for that from which it was separated, and within

which the nebula could undergo further transformations and disruptions.

Now, whether Science be right or wrong, it would appear at least to have the sanction of the ages, since we find its reasoning, *mutatis nominibus*, to be the Mythologic version pure and simple. The pains and contractions of Gæa personified the local condensation; the Titans represented the alterations that took place in matter; the Hecatoncheires and Cyclopes stood respectively for the physical and chemical forces: all these acted through Kronos or time, with the final result of Uranus or the firmament being separated from participation in the further changes that were destined for our Universe and Earth.

Could personification be more appropriate, more terse, or better applied? It is after this fashion that Hesiod proceeds to describe the results of that *æternum vulnus* which has been recorded by Jew, Greek, Roman, Persian, Goth, and Indian, by the wise indeed of every nation that has a written language upon record. The narrative is the first of three remarkable passages in his Theogony where the poet resorts to dialogue. Having mentioned the Cyclopes and Hecatoncheires he proceeds thus:

- 1 ὅσσοι δ' ἄρ' Γαίης τε καὶ Οὐρανοῦ ἐξεγένοντο,
 δεινότατοι παίδων, σφετέρῃ δ' ἥχθοντο τοκῇ
 ἐξ ἄρχῃς· καὶ τῶν μὲν ὅπως τις πρῶτα γένοιτο,
 πάντας ἀποκρύπτασκε, καὶ ἐς φάος οὐκ ἀνίσκε,
- 5 Γαίης ἐν κευθμῶνι, κακῷ δ' ἐπετέρπετο ἔργῳ
 Οὐρανόσ. ἥ δ' ἐντὸς στοναχίζετο Γαῖα πελώρη
 στενωμένη· δολίην δὲ κακὴν ἐφράσσαστο τέχνην.
 αἶψα δὲ ποιήσασα γένος πολιοῦ ἀδάμαντος
 τεύξε μέγα δρέπανον καὶ ἐπέφραδε παισὶ φιλοισιν.
- 10 εἶπε δὲ θαρσύνουσα, φίλον τετιμημένη ἦτορ·
 Παῖδες ἐμοὶ καὶ πατὴρ ἀτασθάλου, αἳ κ' ἐθέλητε
 πείθεσθαι, πατὴρ κε κακὴν τίσαιμέθα λῶβην
 ὑμετέρων· πρῶτερος γὰρ αἰεκέα μήσατο ἔργα.
 Ὡς φάτο· τοὺς δ' ἄρα πάντας ἔλεν δέος, οὐδέ τις αὐτῶν
- 15 φθέγγετο· θαρσύνουσα δὲ μέγας Κρόνος ἀγκυλομήτης
 ἅψ' αὐτὶς μύθοισι προσήυδα μητέρα κεδνὴν·
 Μῆτερ, ἐγὼ κεν τοῦτό γ' ὑποσχόμενος τελέσαιμι
 ἔργον, ἐπεὶ πατὴρ γε δυσωνύμου οὐκ ἀλεγίζω
 ἡμετέρων· πρότερος γὰρ αἰεκέα μήσατο ἔργα.
- 20 Ὡς φάτο· γήθησεν δὲ μέγα φρεσὶ Γαῖα πελώρη.

εἶσε δέ μιν κρύψασα λόχῳ· ἐνέθηκε δὲ χειρὶ
 ἄρπην καρχαρόδοντα· δόλον δ' ὑπεθήκατο πάντα.
 ἦλθε δὲ Νύκτ' ἐπάγων μέγας Οὐρανός. ἀμφὶ δὲ Γαίῃ
 ἱμεύων φιλότῃτος ἐπέσχετο καὶ ῥ' ἐτανύσθη
 25 πάντῃ· ὁ δ' ἐκ λοχεοῖο παῖς ὠρέξατο χειρὶ
 σκαῇ, δεξιτερῇ δὲ πελώριον ἔλλαβεν ἄρπην,
 μακρὴν, καρχαρόδοντα, φίλου δ' ἀπὸ μήδεα πατρὸς
 ἐσσυμένος ἤμησε, πάλιν δ' ἔρριψε φέρεσθαι
 ἐξοπίσω.

Theog. 154—181.

Of all that sprang from Uranus and Ge,
 Most mighty of her children then were these
 Who from the first proved hateful to their sire ;
 And Uranus, as each was first begot,
 Concealed them all within the womb of Ge,
 Allowed them not to go towards the light,
 And kept rejoicing in his evil work.
 But moving Ge, contracted, groaned within
 And pondered on the artful evil work.
 Quick, with her offspring dear, she planned and shaped
 A mighty semilunar curve, a work
 That she had made of crystal hard and clear.
 Then cheering spoke, though tortured in her heart :

" O sons of an expansive sire, and mine,
 If only willing were ye to be moved
 We could correct your father's evil blow ;
 For he the first has planned incongruous works."

Thus she ; then tremor seized them all, but yet
 No part of them responded. Boldly now,
 With crafty speech great Kronos answered back
 In words responsive to his parent kind :

" It may be, mother, crouched beneath this work
 The deed I'll do, since for this sire of ours,
 With name so inauspicious, I care not ;
 For he the first has planned untimely works."

Thus he ; and moving Ge rejoiced in heart.
 In wait she secret laid him ; in his hand
 A weapon curved, with jagged teeth, she placed ;
 And artifice of all kind set below.

Then bringing night came mighty Uranus,
 Who yearning fellowship was stretched round Ge,
 And strained indeed was she on every side.
 But from his ambush stretched himself her son,
 Who brandished, now to left, and now to right,
 The quivering, far-reaching, jagged blade,
 And from his sire cut swift and flung behind
 The plans, hereafter to be claimed his own.

NOTES.

- 2 *ἤχθοντο*—Chemical force as requiring bodies of different kinds to act on, and Attraction, Figure, and Divisibility, as tending to cohesion, distinctness, and limitation, are antagonistic to the expansion or diffusion of matter. In the Hebrew version of Genesis the word used for “firmament” is *expansion*.
- 3-5—As matter cooled and assumed form on the surface it would commence to seek the centre of the mass.
- 6-7—As Helmholtz says, “*Condensation*” (*στενωμένη*) “must have taken place before the play of chemical forces began,” and the result would be a *shrinkage of the interior* (*στοναχίζετο ἐντὸς*):
- πέλωρη*—The usual meaning assigned the word is “monstrous, prodigious, huge, &c.,” with the collateral notion of *terrible*. The derivation is *πέλω* “to be in motion,” and this idea of *motion* it is that as “writhing, distorted, convulsive, hissing, quivering, &c.” renders it terrible and monstrous, and equally applicable to the *earth as a moving whole*, as to the things of earth, such as the Cyclops, a goose, a sword blade, &c. Not the size but the motion of an object it is that strikes us with awe and terror.
- 8 *πολιοῦ ἀδάμαντος*—We do not know what the composition of the ancient adamant was. The derivation (if a *δάμαω*) points to “hardness, unalterableness,” and connects it with the matter of the “crystalline spheres.” Lines 8 and 9 are vividly descriptive of the Nebular Hypothesis.
- 11 *ἀτασθάλου*—*ἀτας θάλλω*, “to swell excessively.”
- 12 *πείθεσθαι*—If the molecules would only “*be moved to act*” intensely enough, the vibration of their component atoms would be such as to overcome all cohesion, and to bring matter back to that simple condition—the formless universe—when Uranus was not.
- 14 *ἔλεν δέος*—Her words had at least roused them from inaction, and some *trembling efforts* were made on their part towards assuming dimensions; but their atomic parts responded not sufficiently.
- 17 *ὑποσχόμενος. ὑπέχω, ὑπεσχόμεν*—Let alterations in matter go on below, and let time be added; then would disruption follow.
- 18 *δυσωνύμου*—The name, Uranus or “Expansion,” is not pleasing to *insatiate* Kronos; neither is that of Uranus or “the limiting boundary, or firmament.”

“I bring the truth to light, detect the ill;
My native greatness scorneth bounded ways.”

Lord Brooke, on Time.

- 19 *ἀεικέα ἔργα*.—He ends with the same words that Gē did. But, whereas Gē regarded the works from a *material* point of view, and called them “incongruous,” Kronos looks on them from his standpoint and terms them “untimely, not suited for time.”

He draws a subtle distinction in the meaning of *αἰκέα*; but we must remember that he is the *μέγας ἀγκυλομήτης*.

- 24 *ἐτανύσθη*.—Owing to the pressure from above, and to the heat below. “A volume of gas can be compressed with very little force to half or one-fourth of its bulk, or in short to such an extent that in many cases the molecules sufficiently approximate to form a liquid: further pressure, or pressure under abnormal conditions, will form it into a solid.”
- 26 *σκαίῃ; δεξιτερῇ*.—With two mighty sweeps, an upper and an under, was the firmament cut away; and all that remained embraced within was henceforth under the sway of Time (*φέρεισθαι ἐξοπίσω*).

That the Universe has been formed on a great plan or scheme is universally conceded. The astronomer views the stars, recognises the existence of laws that govern their movements, rotation, brightness, eclipse, and relative positions, and has successfully tracked the gradual building of an orb from incandescent gas to solid crust, from a nebula to an earth.

The geologist searches the rocks of our planet and sees strata after strata from granite to drift, and always in orderly succession. The palæontologist follows in his steps and finds a methodical succession of plant and animal life, from algæ to olive, from protozoa to Man.

There is no faltering, no break in the Scheme. It commences with Being that embraced matter and mind closely mingled in the vast nebula: it culminates with the rational and self-conscious individual, Man. Between the two extremes were many links, thousand ramifications, and innumerable changes, not only for the orbs of heaven, but for the mineral, vegetable, and animal individualities of our globe. But for the firmament there were none that we know of. When formed it must be supposed as deprived of further participation in the changes destined to go on within its boundary. To put it still plainer, when the incorruptible or unchangeable firmament was cut away from the changeable nebula, *the plans of this changeable Gæa were cut away from Uranus*. This is what the myth means, and what Hesiod says distinctly when he writes “and swiftly cut away from (*ἀπὸ*) his dear sire the plans.”

CHAPTER VIII.

“*CONCORDIA MUNDI.*”

AND thus was the Firmament spread out “like a curtain,” and the work of the Second Day completed.

Henceforward we have to regard our nebulous universe not as a more or less homogeneous whole, but as composed of three distinct parts,—a Uranus or firmament acting as a circumferential boundary; a Gæa or nebulous mass that had grown smaller by shrinkage, with a constant tendency to such contractions within itself as would bring on the pangs of labour and minimise its bulk by the throwing off of ring after ring of its own substance; and an interval of space between the first and second, in which a succession of all-important changes was destined to occur.

We cannot conceive this last as a perfect vacuum, since from the very first flocculi from both firmament and nebula would probably be found therein, and form by further expansion an attenuated medium or ether; and as from time to time there floated away from the mass *nebulae* that were to form the starry denizens visible to the reason, telescope, or eye, this medium must have received additions which rendered it comparatively denser, and thus proved a factor in limiting the distance to which each successive misty world advanced.

It served, too, as a medium for that tie which binds as a whole the disassociated members of the Cosmos,—that Harmony of the Universe which has been recognised by the science and hymned by the poetry of every age. Ovid, as already pointed out, alludes to it in the line

Dissociata locis concordi pace ligavit.

We quote from Lucan, and from what might be its paraphrase by Tickel,

Nunc ades, æterno complectens omnia nexu,
O rerum, mixtique salus Concordia mundi,
Et sacer orbis amor.

“Kind Concord, heavenly born! whose blissful reign
Holds this vast globe in one surrounding chain.”

It is with a description of this Concord, under the mythical name of Aphrodite, that Hesiod appropriately concludes the separation of the firmament. Having told in a few anticipatory lines how our Earth, as a consequence of the separation, produced in after years the Erinyes, Giants and Melian Nymphs, he resumes the thread of his narrative:—

- 1 μῆδεα δ' ὥς τοπρώτον ἀποτμήξας ἀδάμαντι
κάββαλ' ἀπ' ἡπείροιο πολυκλύστῳ ἐνὶ πόντῳ,
ὥς φέρετ' ἅμ' πέλαιος πουλὺν χρόνον, ἀμφὶ δὲ λευκὸς
ἀφρὸς ἀπ' ἀθανάτου χρόος ὤρνυτο· τῷ δ' ἔνι κούρη
- 5 ἐθρέφθη. πρῶτον δὲ Κυθήροισι ζαθέοισιν
ἔπλητ', ἔνθεν ἔπειτα περὶ ῥυτον ἵκετο Κύπρον.
ἐκ δ' ἔβη αἰδοίη καλὴ θεός, ἀμφὶ δὲ πόιη
ποσσὶν ὑπο ῥαδινοῖσιν ἀέξετο· τὴν δ' Ἀφροδίτην,
ἀφρογενέα τε θεὰν καὶ εὐστέφανον Κυθήρειαν,
- 10 κικλήσκουσι θεοὶ τε καὶ ἄνθρωποι, οὐνέκ' ἐν ἀφρῷ
θρέφθη· ἀτὰρ Κυθήρειαν, ὅτι προσέκυρσε Κυθήρους·
Κυπρογενέα δ', ὅτι γέντο πολυκλύστῳ ἐνὶ Κύπρῳ·
ἦ δὲ φιλομμηδέα, ὅτι μηδέων ἐξεφάνθη.
- 15 τῇ δ' Ἔρος ὠμάρτησε καὶ Ἰμερος ἔσπετο καλὸς
γαινομένη ταπρώτα θεῶν τ' ἐς φύλον ἰούσῃ.
ταύτην δ' ἐξ ἀρχῆς τιμὴν ἔχει ἥ δὲ λέλογχε
μοῖραν ἐν ἀνθρώποισι καὶ ἀθανάτοισι θεοῖσι,
παρθενίους τ' ὀάρους μειδήματά τ' ἐξαπάτας τε
τέρψιν τε γλυκερὴν φιλότῃτά τε μειλιχίην τε.

Theog. 188—206.

So too the plans, the very first as 'twere
That he had severed from the adamant
And from the main had flung for basis sure
On the tempested deep, were long time borne
Upon the waters, and a whitish froth
From the immortal surface rose all round.
Therein a maid did thrive; and she at first
Was to empyreal matter close attached;
And then to fluid incandescence came.

And forth a stately beauteous goddess passed,
 And 'neath her taper feet the season grew.
 Then her, the foam-begotten deity
 And the well-circled Cytherea too,
 Both gods and mortals Aphrodite call
 For reason that in froth she nurtured was;
 But Cytherea, since she reached the clear;
 Cyprogenia, too, since got she was
 In swelling tide of incandescent heat;
 And Philomede, as from plans she came.
 On her when born and come unto the throng
 Of gods, the elements, did Eros wait
 And sweet Desire did follow in her wake.
 This honour too 'mongst men and gods renowned
 She has from first and gained it as her due,
 The warbling converse, smiles, and wiles of maids,
 Their joy and honeyed love and blandishment.

NOTES.

- 1-4 When cut away from the firmament, the plans abided henceforth with the enclosed nebula. As the ages rolled by this would be divided and sub-divided to form the various bodies of our universe, and interstellar space would become filled with a subtle ether.
- κάβαλ'.—"Who layeth the beams of his chambers in the waters."
 —Psalm civ. 3.
- 2 ἀπ' ἡπείροιο—From the original *whole* that existed before the separation.
- πόντω.—This and the πέλαγος of the succeeding line refer to the nebulous or misty nature of the mass that now lay within the firmament.
- 4 ἀφρός.—The ether, so subtle and impalpable that the poet compares it to the light, unsubstantial bubbles produced by the fermentation or agitation of a liquid mass.
- 5-15 In this ether was Concord nursed, and through it as medium was celestial harmony established, and the spheres bound together as a whole.
- 5 Κυθήροισι.—As it would be absurd to conceive of *localities* existing at an age prior to the formation of a crust upon our globe, it is evident that the terms Cythera and Cyprus are used only for the sake of the *ideas implied derivationally*. Κύθηρα (καθαίρω, ἐκάθηρα, the α being changed into υ as in σῦρξ for σάρξ) means "pure, the purified, clear," and Κύπρος (καπνός, or κάπνυρος, the poetic form of κατάπυρος) denotes "blazing, burning, incandescent." Spectral analysis has shown that the simplest stellar bodies consist mainly of luminous gas or incandescent hydrogen. But

that there is a still more simplified form of matter is reasonable to believe. It is this most *simple condition* that Hesiod styles *κυθήροισι ζαθέουσιν*, while he denotes the *swelling incandescence* by *περίρρντον Κύπρον*, making it, as seen, subsequent to the other.

- 8 Ἀφροδίτην.—By a simple metathesis of the ρ this becomes *ῥαφροδίτην* that is (*ῥάπτω ὁδός*) “the binder of the orbits.” She would be so understood by the learned (*θεοί*), while men of inferior intelligence would recognise her as but “the ethereal wayfarer” (*ἀφρὸς ὁδότης*). It would be the same distinction as was made between Briareus and Ægæon. The Latin *Venus* is probably *ἔνωσις*, “Union.”
- 13 φιλομμηδέα.—Cyptherean Venus would thus denote “the purest affection”; Cyprian Venus, “ardent or impassioned love”; Philomede, or Erycinian Venus, “artful love, the love that laughs at locksmiths.”
- 14 Ἔπος.—*Change* and *Desire* attended her on earth.
 “Ah me! for aught that I could ever read,
 Could ever hear by tale or history,
 The course of true love never did run smooth.”

Shakspeare.

BOOK THIRD.

TOILERS OF THE NIGHT.

CHAPTER I.

THEOGONY.

Nox	{	Moros	
		Ker	
		Thanatos	
		Upnos	
		Oneiroi	
		Momus	
		Oizus	
		Hesperides	
		MÆRÆ	{ Clotho
			{ Lachesis
			{ Atropos
		Keres	
		Nemesis	
		Apate	
		Philotes	
Geras			
Eris			

THE characters in the foregoing table, serving as a sequel to what preceded and a prelude to what was to come, are pictured by Hesiod as the offspring of Night without a consort. In describing the descent of Æneas into Hades, Virgil writes thus :

Vestibulum ante ipsum, primisque in faucibus Orci,
 Luctus et ultrices posuere cubilia Curæ ;
 Pallentesque habitant Morbi, tristisque Senectus,
 Et Metus, et malesuada Fames, ac turpis Egestas ;
 Terribiles visu formæ ; Letumque, Labosque ;
 Tum consanguineus Leti Sopor ; et mala mentis
 Gaudia ; mortiferumque adverso in limine Bellum,

Ferreique Eumenidum thalami, et Discordia demens,
 Vipereum crinem vittis innexa cruentis.
 In medio ramos annosaque brachia pandit
 Ulmus, opaca, ingens; quam sedem Somnia vulgo
 Vana tenere ferunt, folisque sub omnibus hærent.

VI. 273—284.

A cursory examination of those lines will tend to show that the entities mentioned in them, while not arranged in the same order as those of Hesiod, are similar in number and characteristics to these of the children of Nox. The following parallel arrangement may serve to identify them still further and to throw additional light, one on the other.

στυγερός Μόρος	mortiferum Bellum
μέλαινα Κῆρ	Labos
Θάνατος	Letum
Ὕπνος	Sopor
Ὀνειροί	Somnia vana
Μῶμος	turpis Egestas
ἀλγινόεσσα Ὀϊζὺς	Luctus
Ἑσπερίδες	mala mentis gaudia
Μοίροι	ferrei Eumenidum thalami
νηλεοποῖνοι Κῆρες	ultrices Curæ
Νέμεσις	Metus
Ἀπάτη	malesuada Fames
Φιλότης	pallentes Morbi
οὐλόμενος Γῆρας	tristis Senectus
καρτερόθυμος Ἔρις	Discordia demens

As most of these characters are self-explanatory, we proceed at once to quote Hesiod's enumeration and description :

- Νύξ δ' ἔτεκε στυγερόν τε Μόρον καὶ Κῆρα μέλαιναν
 καὶ Θάνατον, τέκε δ' Ὕπνον, ἔτικτε δὲ φύλον Ὀνειρώων
 οὔτινι κοιμηθεῖσα θεὰ τέκε Νύξ ἐρεβεννή.
 δεύτερον αὖ Μῶμον καὶ Ὀϊζὺν ἀλγινόεσσαν,
 5 Ἑσπερίδας θ', αἷς μῆλα πέρην κλυτοῦ Ὀκεανοῖο
 χρύσεια καλὰ μέλουσι φέροντά τε δένδρεα καρπὸν.
 καὶ Μοίρας καὶ Κῆρας ἐγένετο νηλεοποῖνους,
 Κλωθὴ τε Λάχεσίην τε καὶ Ἀτροπον, αἵτε βροτοῖσι
 γεινομένοισι διδοῦσιν ἔχειν ἀγαθὸν τε κακὸν τε,
 10 αἱτ' ἀνδρῶν τε θεῶν τε παραιβασίας ἐφέπουσαι
 οὐδέποτε λήγουσι θεαὶ δεινοῖο χόλοιο,
 πρὶν γ' ἀπὸ τῷ δώωσι κακὴν ὕπνῳ, ὅστις ἀμάρτη.
 τίκτε δὲ καὶ Νέμεσιν, πῆμα θνητοῖσι βροτοῖσι,
 Νύξ ὅλοή· μετὰ τὴν δ' Ἀπάτην τέκε καὶ Φιλότητα,

- 15 Γῆρας τ' οὐλόμενον, καὶ Ἔριν τέκε καρτερόθυμον.
 Αὐτὰρ Ἔρις στυγερὴ τέκε μὲν Πόνον ἀλγινόεντα
 Αἴθην τε Λιμόν τε καὶ Ἀλγεα δακρυόεντα,
 Ὑσμίνας τε Φόβους τε, Μίχας τ' Ἀνδροκτασίας τε,
 Νείκεά τε ψευδέας τε Λόγους Ἀμφιλογίας τε,
 20 Δυσνομίην Ἀτην τε, συνήθεας ἀλλήλοισιν,
 Ὅρκον θ', ὃς δὴ πλείστον ἐπιχθονίους ἀνθρώπους
 πημαίνει, ὅτε κέν τις ἐκὼν ἐπίορκον ὁμόσση.—Theog. 211.

But Night, the Night of ages rolling on,
 With no one mated, bore dread Destiny
 And grim Responsibility; and Death
 And Sleep she bore and multitude of Dreams.
 Again begot she Doubt and grievous Woe,
 And Processes Occult that care full well,
 On this our side of Oceanus famed,
 For flocks and beauteous trees that bring forth fruit.
 She bore the Fates, to Be, to Do, to Die,
 Who good and ill to mortal beings give;
 And the remorseless Cares, all-forceful powers,
 Who following up the sins of gods and men
 Ne'er cease from anger dire till vengeance dread
 Inflict they may upon the one who errs.
 And likewise Apprehensive Dread, a bane
 To living mortals, bore destroying Night;
 And then Deceit she bore, Affinity,
 Carking Old Age, and Strife magnanimous.
 But dreaded Strife did grievous Toil beget,
 Oblivion, Hunger, tearful-bringing Pains,
 Quarrels and Murders, Fights and Homicides,
 Contentions, Lying Stories, Equivoques,
 And lawless Hate,—compatriots all these;
 Likewise the Solemn Oath that worketh woe
 In great degree for dwellers on the earth
 When one perchance has knowingly forsworn.

NOTES.

- 1 *Μόρον*.—The word is derived from *μείρομαι*, perf. *ἔμμορα*, “to receive as one’s portion, to get one’s due.” The Latin equivalent is *fatum*, “fate; that order and series of things decreed from eternity, and from which there is no deviation or escape.” Dryden pictures it well:

“Alas, what stay is there in human state,
 Or who can shun inevitable fate?
 The doom was written, the decree was past,
 Ere the foundations of the world were cast.”

Since destiny comes into operation with life, and since life is

but a battle for existence, and a battle that inevitably leads to death, Virgil has called Moros, "mortiferum bellum."

Κῆρα—There is but one Ker, as there is but one Moros, in Mythology, and that Ker (κρή, "that which must needs be"; κρεος, "a business of necessity, a charge, a care"), is the personification of "Responsible charge" or "Care," for in the strict sense of the word, Care is a "charge implying responsibility, a trust, the management of a trust."

Ker would thus be the equivalent of the "Providence" of God, of that divine arrangement of all things to one end. Everything, the universe, earth, man, has been created in accordance with a plan and towards an end. In its own way, each created work is indebted for the purchase price of existence from nihility, and is responsible for the amount to the last farthing. And the higher in creation's rank each being is, and the more endowed with intellectual attributes to understand the plan and end, the greater must justifiably be the responsibility attached. As Russo puts it: "Can we suppose that when God, by an act of His infinite power, sends forth rational creatures into space and time, He tells them that they are not bound to acknowledge the Author of their existence; that they are dispensed with showing Him sentiments of gratitude and love; that, in a word, they are independent as He himself is independent? Creation with such a sequel would be an absurdity and the greatest of misfortunes."

In this general idea of "responsible charge" is consequently involved that of "conscience" for rational beings, and hence we can understand the relation of κήρ to κῆρ, "the heart," as also of κρή to χράω, "to deliver an oracle," for, as Byron says, "Man's conscience is the oracle of God." We can in this way, too, trace the dominant idea in Virgil's mind when he paralleled κήρ by "Labos," since "we must *work* out our salvation with fear and trembling," each for himself.

There are many passages in the Greek classics where the interpretation of "charge, care, conscience, duty," will render the meaning more intelligible and vivid. Thus it is that love of *strife*, the martial *din*, and the soldier's *duty* "with conscience wide as hell," are made companions in the battle-field under the names of *Eris*, *Kudoimos*, and *Ker*. Thus, too, it is that Achilles scoffingly remarks to Agamemnon, after having reproached him with never joining in the fray or ambuscade, "τὸ δέ τοι κῆρ εἴδεται εἶναι," Il. I. 228, "But this to thee our duty seems to be."

3 ἐρεβεννῇ—ἐρεβος ἔννος, "the evolution of the years."

4 Μῶμον—From μή οἶμαι, "to suppose, imagine, or believe as *not*"; or μή ᾔμμαι, "not to see, not to know, not to understand"; or μῶμαι, "to desire eagerly, to inquire, or seek after." Censure and ridicule are the peculiar weapons of *Doubt*, whose mission it is to thirst and search for truth and facts, and when found, to see them not, to hear them not, to understand them not. Hence does Virgil style it "turpis egestas," "shameless *negation*," shameless want, whether of confidence, truth, knowledge, or religion. The censure of the gods by Momus means that Doubt finds flaws in all things from earth below to stars on high; even the gait of Venus—the harmony of the universe, is discordant to his senses,

5 Ἑσπερίδας—There are “unexplored remainders” everywhere around us. We find them in every branch of knowledge—physical, mental, and intellectual. The divine meets them in the Unity and Trinity; the astronomer in the sun-spots and nebulous rifts; the geologist in the primal crust; the chemist in the atom; mathematician in the point; geographical explorer in the North and South Poles; the physicist in the embryo; and so on. There is ever and always a *something* that we cannot grasp, an intangible tangibility, and it is this that Mythology personifies in the Hesperides. They are the influences that preside over the “unexplored remainders”; they are, as the name denotes (ἑσπέρα εἶδος), “the evening-like, the obscure”; or, if we so prefer, they are (σπειρώω), “whatever is wrapped up or concealed from the view or understanding.” Their genealogy marks them as being connected with those germinal processes of which we know so little. Hesiod makes them children of Nox; other writers describe them as the offspring of Phorcys and Ceto, of Atlas and Hesperia, of Zeus and Themis. There is really no difference save as to the beginning, one writer going back to the universe, and the others to our system, our earth, or to Life.

We thus see that whatever their ancestry be, they are invariably connected with what is “obscure or unexplored.” Geographically applied, we find them, as a consequence, shifted, as knowledge advanced, from the original habitat of the human race to the countries west of Asia Minor, thence to the equatorial tracts of Africa, to the extreme west or Western hemisphere, and finally to the Hyperborean or Polar regions—the geographical Hesperides of modern times. In the same manner, do they stand for all those other “unexplored remainders” that elude the view, the knowledge, skill, or understanding; and they are confessedly not a few in number.

“The mind of man is this world’s true dimension,

And knowledge is the measure of the mind:

And as the mind, in her vast comprehension,

Contains more worlds than all the world can find,

So Knowledge doth itself far more extend

Than all the minds of man can comprehend.”—*Brooke*.

To explore his world is the mission and the duty of the living man, no doubt. Is there a limit to each charge? Time, for one thing, bounds the former. Does anything bound his duty? If a purely physical act could weaken the understanding, can a purely mental one antagonise the intellect? Is not obedience as likely a factor in one case as the other, and does not obedience imply something forbidden? What is that something—that dividing line between the sacred and the accursed springs of knowledge? Even that does the “audax gens humana” want to know.

“The wish to know—that endless thirst,

Which even by quenching is awaked,

And which becomes or blest or curst,

As is the fount whereat ’tis slaked.”—*Moore*.

It must have been such a sentiment that made Virgil parallel the Hesperides by “mala mentis gaudia,”

πέρηγ κλ. Ωκ.—Oceanus represents the vast mass of aqueous vapour surrounding our earth. It has, consequently, two sides, one spreading into infinite space, the other limited by the surface of our globe where the Hesperides are stationed.

6 χρύσεια δένδ. καρπόν.

“Of man’s first disobedience, and the fruit
Of that forbidden tree whose mortal taste
Brought Death into the world and all our woe.”—*Milton*.

7 Μοίρας—The Mærae were the agents or distributors of Moros or Fate, and were accordingly termed *Parcae* by the Romans, as being “the accomplisners or fulfillers” (πράσσω) of the eternal and irrevocable φάρόν. As the destiny of all things can be said to consist in being, doing, dying, Mythology enumerates three Mærae, viz.: Clotho, the fate that spins (κλώθω) the thread of being; Lachesis, she who assort (λαγχάνω) the duties to be done; and Atropos, the fate that cannot be avoided (α τρέπω).

“While man is growing, life is in decrease,
Our cradles rock us nearer to the tomb;
Our birth is nothing but our death begun.”—*Young*.

If it be true that we are all born with the germs of life, action, and decay, then each of the three weird sisters is a spinner at the loom, and the white and black threads of Clotho and of Atropos are inextricably mingled with the chequered one of Lachesis. What the prevailing colour of *her* thread may be depends entirely on ourselves. “As a man sows, so shall he reap,” is Scriptural language, of which the homely paraphrase is, “We must all lie upon the bed which we have made.” Either text will serve to show why Virgil has paralleled the Greek Mærae by “ferrei Eumenidum thalami.”

Κήρας—What the Mærae are to Moros, the Keres are to Ker, distributing agents of Providence. Providence is two-fold; the arrangement of all things towards their ends, and the execution in time of such arrangement through suitable media. The Keres are emblematic of those media by means of which the arrangement of Providence is carried to accomplishment. Each of us, like Achilles, has a choice of Keres or duties, whether of war or peace, action or indolence, plough or pen; but whatever we embrace, however high we mount or low we fall, we are attended by the satellites of grim responsibility. If we perform our part properly, it is well; if not, then conscience stings us with its thousand tongues.

“The human race are sons of sorrow born,
And each must have his portion.”—*Mallett*.

14 Φιλότητα—If matter remained elementary there would be no decay. Affinity, by causing the elements to unite and become compounds, brings on disorganisation and disease. Rust is an example of what Affinity can effect in metals. Hence it is that Virgil has paralleled Philotes by “pallentes morbi.”

BOOK FOURTH.

WORLD-BUILDING.

CHAPTER I.

THEOGONY.

PONTUS GÆA.

NEREUS	THAUMAS	PHORCYS	CETO	EURYBIA
m.	m.			m.
Doris	Electra			Crius
{ Nereides	{ Harpies	{ Ophis	{ Graie	{ Gorgons, viz. :
Oceanus		Neptune	Medusa	Stheno
Tethys				Euryale
Callirrhœ		Chrysaor	Pegasus	
Geryon		Echidna	Typhaon	
		{ Orthos	{ Sphinx	
		{ Cerberus	{ Nemean Lion	
		{ Lernæan Hydra	{ Chimæra	

MYTHS.

Pontus—born of Gæa and united to her after her separation from Uranus. Their offspring were five in number, namely, Nereus, Thaumas, Phorcys, Ceto, and Eurybia.

Nereus—the eldest born of Pontus, and united to Doris, daughter of Oceanus, by whom he became the father of the Nereides. His domain is the sea, and the poets have gifted him with prophecy and the power of assuming different shapes.

Nereides—daughters of Nereus and Doris, and fifty in number. As being marine nymphs they dwell in their sire's domains. They are propitious to sailors, and were worshipped throughout Greece, particularly in the seaport towns.

Thaumas—another son of Pontus, wedded to the Oceanid Electra, by whom he begot Iris and the Harpies.

Iris—the messenger of the gods to one another and to men, but later on the peculiar attendant and messenger of Juno. Some writers identify her with the rainbow, while others make it as but the path on which she travels, appearing and vanishing as required.

One of her peculiar functions is to bear in a golden bowl the Stygian waters to such divinities as have proved faithless in the eyes of Zeus. She has wings on her shoulders, a herald's staff in her hand, and a tunic or zone of many colours.

Harpies—described by Hesiod as fair-haired, winged beings, attended by winds and birds of prey. Homer alludes to them as storm-winds reputed to carry off whatever or whosoever was reported as having suddenly disappeared from earth. Æschylus represents them as hideous creatures with wings; Virgil as part bird, part maid, with long claws and faces pale with hunger, and as defiling whatever food they left undevoured. Hesiod names two, Aëlo and Ocypete; Virgil mentions another, Celæno; Aëllopos, Nicothoë, Ocynthoë, Ocypode and Acholoë are added by other writers. Their original abode was Salmydessus in Thrace, where they tormented the blind Phineus. When expelled from there by the sons of Boreas they took refuge in the Strophades, and here it was that Æneas encountered them previous to his arrival at Carthage.

Phorcys—son of Pontus and Gæa, brother of Ceto, to whom he was united, and by whom he begot the Graiæ, the Gorgons, and Ophis.

Ceto—daughter of Pontus and Gæa, and joined in wedlock to her brother, Phorcys.

Graiæ—children of Phorcys and Ceto, and alluded to by all writers as being gray from their birth. Hesiod mentions but two, Pephredo and Enyo. Apollodorus names three, Pephredo, Enyo, and Deino, and says that they had only one eye and one tooth in common, which they borrowed from one another when required.

Gorgons—children of Phorcys and Ceto, who resided on the borders of

Night beyond Oceanus, where the Hesperides were situated. Homer mentions but one, Gorgo, dwelling in the depths of Hades. Hesiod enumerates three, Stheno, Euryale, and Medusa. The first two were immortal; Medusa alone was mortal, and the most famed in song and story. Originally she was a maiden, most beautiful in form, and one of her chief attractions was her golden hair. Neptune had intercourse with her, it is said, in the temple of Minerva, in consequence whereof the incensed goddess changed the Gorgon's hair to writhing snakes, and rendered her head and those of her sisters so hideous as to turn all who looked upon them to stone. Some writers say that Medusa was the only one of the three who had serpents in her hair.

Perseus, son of Zeus and Danae, was commissioned by Polydectes to cut off Medusa's head. The details of the story are thus told by Apollodorus (2. 4. 2. 3):—

"Guided by Mercury and Minerva, he (Perseus) comes to the daughters of Phorcys, namely, Enyo, Pephredo, and Deino. These were children of Phorcys and Ceto, sisters to the Gorgons, and gray from birth. The three had but one eye and one tooth, and these they changed in turn with one another. Of which having got possession, Perseus said, when they demanded them back, that he would return them if they took him down to the path leading to the nymphs. These nymphs had the winged sandals, the kibisis (which is said to be a bag), and the helmet.

"The daughters of Phorcys having taken him down, he gave them back the eye and tooth; and when he came to the nymphs and got what he desired, he put the kibisis round him, fitted the sandals to his ankles, and placed the helmet on his head: having this last, he was able to see whomsoever he wished, and could not be seen by others. Having also got an adamantine rapier from Mercury, he came to Oceanus flying and found the Gorgons lulled to sleep. These were by name, Stheno, Euryale, and Medusa. Medusa alone was mortal; and for this reason had Perseus been sent for her head. These Gorgons had heads encompassed with the scales of dragons, had teeth monstrous as those of boars, brazen hands, golden wings with which they flew, and they made stones of all that kenned them (*τοὺς δὲ ἰδόντας λίθους ἐποίουν*). Standing over them asleep, Minerva directing his hand aright, Perseus turned one side, and looking into the brazen orb through which he saw the likeness of the Gorgon, he decapitated her." Then he put the head into his kibisis, and by means of the helmet which rendered him invisible he escaped from the pursuit of the remaining two Gorgons. After going through many other adventures, Perseus returned the

sandals, kibisis, and helmet to Mercury, who restored them to the nymphs. The Gorgon's head he gave to Minerva, who placed it in the middle of her shield or breast-plate.

Pegasus.—When the Gorgon's head was cut off by Perseus, her two children by Neptune sprang from the wound: these were Chrysaor and Pegasus. This latter is described as a winged horse that was born near the springs of Ocean, whence he ascended to the immortals, and dwells in the halls of Zeus, to whom he carries the thunder and the lightning. Other traditions describe him as the horse of Aurora, and place him among the stars. All unite in regarding him as connected with the Muses, and as having produced the fountain of Hippocrene from Mount Helicon with a blow of his hoof.

Chrysaor—son of Neptune and Medusa, brother of Pegasus, and born with him after the decapitation of the Gorgon. He was united to Callirrhœ, daughter of Oceanus, and by her he begot Geryon and Echidna.

Geryon—son of Chrysaor and Callirrhœ, reputed to have had three heads, or, according to some, three bodies united together. He dwelt in the island of Erythia, situated in the west near the ocean, and had magnificent, reddish-colored oxen, that were tended by the herd Eurytion, and guarded by Orthos, a two-headed dog born of Echidna and Typhaon. To carry off those oxen was assigned to Hercules as his Tenth Labour. This he succeeded in doing after killing the dog, the herd, and Geryon himself.

Echidna—sister of Geryon, and called by Hesiod the daughter of Chrysaor and Callirrhœ. Other writers call her the offspring of Tartarus and Gæa; still others, of Peiras and Styx. She is described as a huge, unformed being; a beautiful nymph in face and body, but snake-like as to her limbs; as immortal, undecaying, and devouring raw flesh in caves beneath the ground. According to Hesiod, she was drawn down beneath the Arimi; Apollodorus says that she was reported to have been destroyed by Argos Panoptes. In quest of his Ninth Labour, the girdle of Hippolyte, queen of the Amazons, Hercules is said to have visited the Hyperboreans, and to have begotten there by Echidna three children, Agathyrus, Gelonus, and Scythes. She is described as wedded to Typhaon, by whom she begot Orthos—the two-headed dog of Geryon, Cerberus—the three-headed dog of Hades, the Lernæan Hydra, the Chimæra, the Nemean Lion, and the Sphinx. According to Hesiod, the last two—the Sphinx and Nemean Lion—were born of Echidna and of Orthos; others call them children of Orthos and the Chimæra; still others, of Typhaon and Chimæra.

Chimæra,—a fire-breathing monster, huge, swift, and strong, having

three heads, a lion's placed in front, a goat's in the middle, and a dragon's head behind. She committed terrible havoc, but was finally destroyed. The story runs thus: Bellerophon, having unwittingly killed his brother (who has been variously called Bellerus, Deliades, Peiren, and Alcimenes), came to the court of Prætus in order to be purified. Antæa (called Sthenobæa by some writers), the wife of Prætus, and daughter of the Lycian king, Iobates, conceived an attachment for Bellerophon, and made overtures to him. When he fled from her advances she became incensed, and made her husband believe that Bellerophon had attempted to betray her. Either fearing or being unwilling to kill him with his own hands, Prætus sent his guest to Lycia, and gave him letters to Iobates, requesting that the bearer should be destroyed. To make his death assured, as he thought, Iobates ordered him to wage battle against the dreaded Chimæra. Aided by the gods, the hero caught and mounted the winged horse Pegasus, rose into the air, and destroyed the monster with his arrows.

The continuation of Bellerophon's story is as follows: After various adventures he married the daughter of Iobates and was named successor to the throne. But having attempted to fly to heaven upon Pegasus, the winged steed, by order of Zeus, flung him blind and maimed to earth. Homer says that he drew upon himself the anger of the gods, and was finally compelled to wander blind, solitary, and far from the paths of men, in the Aloëan fields.

CHAPTER II.

THE LUMINOUS PAST.

THE separation of Uranus from Gæa is one of the foremost events in Mythology. The next to stand out in importance is the Battle of the Titans. But whereas the first has reference to our universe as a whole and ends with the formation of a firmament, the Titanomachia belongs peculiarly to our globe and ends with well-established Life.

Gæa, Pontus, and their immediate offspring, are universal terms, it is true, since they are applicable not only to our universe as a whole, apart from the firmament, but also to each of the stellar systems and to the individual stars of such systems into which our universe was subsequently divided. But henceforward our attention is peculiarly invited to that particular portion of matter which sometime in the course of ages assumed an existence apart from all other portions, and which we have called our Earth. The beginning of this independent existence is marked in Mythology as the union of Gæa with Pontus, and the offspring begotten of these and the descendants of such offspring denote the many and varied changes that occurred and intervened between an incandescent mass and the same mass with granite for a basis.

Principal among those changes would be the first crust that solidified upon the molten surface, the waters that established themselves upon the crust, and the elevation of dry land above the surrounding waters.

Having described the formation of a firmament, Genesis thus proceeds :

9. And God said, Let the waters under the heaven be gathered together unto one place, and let the dry land appear : and it was so.

10. And God called the dry land earth; and the gathering together of the waters called He seas: and God saw that it was good.

11. And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so.

12. And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind: and God saw that it was good.

13. And the evening and the morning were the third day.

It is with the events of this third day that all the mythical characters from Pontus to Zeus are connected; and it is with the events described in verses 9 and 10 that the offspring and descendants of Pontus and Gæa are specially concerned. How the dry land appeared, how the seas were gathered together, and how corresponding changes occurred in the gaseous envelope around our globe, are the pith and marrow of all the myths and mythical characters embraced between Pontus and Echidna.

Pontus and Gæa.—What the condition of its matter was when our earth, sufficiently cooled to prevent all further disruption on its part, began a sure and independent existence in space, is not known. There may be, and probably is, a still more simple condition than that of incandescence. Hesiod has suggested it in his "Cytherea," and certain of the nebulae which the most powerful telescope has failed to resolve into stars are conceived by some scientists to be "belated portions, so to speak, of the same soft and diffused material which, countless ages ago, was condensed into the defined bodies forming the remainder of our solar system." It is worthy of note, too, that the coronal atmosphere of the sun is said to consist mainly of sub-incandescent hydrogen "and another element which may be new." Such a condition, if existing, may be considered as the closing chapter of speculative philosophy with regard to the matter of our globe. The succeeding stage and much of what followed belong to speculative geology, and in this wise does it proceed to tell the story. In its early infancy, when earth had dissolved for good and aye co-partnership with each and every of the celestial

cohort, it was a luminous gaseous mass, surging ever from internal convulsions or outward disturbances, or from both, irregular in shape, thousands of times greater in volume than at present, and equalling, if not surpassing Sirius, "the monarch of the skies," in heat and brilliancy. It was, in brief, a sun illumined by its own light, glowing with its own heat, and composed of matter elementary or fashioning into elementary, since the same hydrogen line would be shown by the spectroscope that we now observe in Sirius and stars like Sirius. As it waxed in years and lost some of its intensity by radiation of its light and heat into outer space, its materials became more differentiated into elements, it shrank in volume, and assumed a structure like to that of our sun, namely, a solid or liquid incandescent nucleus, surrounded with layer after layer of glowing vapour that evinced the presence of iron, zinc, copper, sodium, magnesium, calcium, and other elements in addition to vast quantities of hydrogen. All these would be in a state of incandescent vapour, and the orb itself would in all respects resemble our sun in light, heat, and gaseous layers which would every now and again be thrown into violent and surging billows that revealed the dark spots underneath. And so would it proceed for cycle after cycle, cooling and contracting, defining into shape and boundary, changing in colour possibly from white to yellow, from yellow to orange, and from that to red, till it became at last a "dying out sun." While these changes were occurring, the atoms that had been there from the first, and that had been kept disassociated by the intense heat, came closer and closer together, and the elements appeared, one by one, as it were, hydrogen first, then the metals, and then the metalloids, oxygen, nitrogen, silicon, carbon, sulphur, chlorine, and others.

During all these æons what was the principal characteristic of our earth? There is but one answer—Luminosity; for it was at the expense of luminosity that it cooled, shrank, and allowed the elements to differentiate. And this luminosity was derived from no outward source ;

it must have been inherent in matter itself from the beginning, must have grown with its growth, divided with its division, and attached itself to each member of the universe; among others, to earth itself.

Now, this is identical with the myth which makes Pontus the offspring of Gæa without a partner, antecedent in being even to molecular matter, and subsequently united to his parent after her divorce from Uranus. The derivation points to the same conclusion, since Πόντος (allowing for the well-recognised interchanges of π and φ, and of ο and α, as instanced in πανός and πάνη for φανός and φάνη, στροτός and δνία for στρατός and λνία), is equivalent to Φάντος, and thus signifies "giving light, luminous."

Hesiod, having mentioned how Gæa begot Uranus and the Ourea, says:—

ἡ δὲ καὶ ἀτρύγετον πέλαγος τέκεν, οἴδαμι θῦον,
Πόντον, ἄτερ φιλότῃτος ἐφίμερον.—Theog. 131.

And Pontus, too, a vaporous expanse
That glowing raged with turbulence, she bore
While still from sweet affinity aloof.

- 1 αἰτρώγετον.—α τρώγω "not dry," that is "moist, vaporous," just as we say "in a *nebulous* condition." We also find ἀτρώγος (α τρώξ) "clarified, pure, simple." With the same meaning, "moist" or "pure," does Homer apply it to the ether:

σιδήρειος δ' ὀρυμαγδός
χάλκεον οὐρανὸν ἴκε δι' αἰθέρος ἀτρυγέτοιο.—Il. XVII. 424.

The usual rendering, "yielding no harvest, unfruitful" (α τρυγάω) has nothing to recommend it, since in their own way the sea and air are as fruitful as is the land in its way.

πέλαγος.—The word is used to denote anything *vast* in volume, extent, &c. So do we speak of "a sea of troubles," "the ocean of eternity."

οἴδαμι θῦον.—"raging with swell," as the gaseous layers of the incandescent orb would be by commotions within and without the mass. Hesiod has elsewhere (line 189) used the words πολυκλύστῳ ἐνὶ πόντῳ "on the tempestured deep," and again in line 199, πολυκλύστῳ ἐνὶ Κύπρῳ "in the tempestured incandescent mass." θύω, "to slay or burn a victim in sacrifice; to rush with violence," has for its radical, according to Passow, the sense of "to burn, to fire."

- 2 ἄτερ φιλότῃτος.—There can be no affinity when there is only *one* kind

of matter. At this stage of being matter was but atomic, for the molecular Titans were not yet born. "If the earth consisted of but one kind of matter, mercury, for instance, there might be gravitation and cohesion, but affinity would be impossible."—*Youman*.

It is consequently but a question of words for Science to say that our earth was at one time an incandescent mass, in a vaporous condition, and liable to violent commotions in its surrounding layers; and for Mythology to say that Gæa was united to Pontus, and that this Pontus was an ἀτρύγετον πέλαγος οἰδματι θῦον.

It must be this early stage of Earth's existence that Virgil writes of in his sixth Eclogue, and it must be in this sense of vaporous incandescence that the "liquidi ignis" must be understood :—

Namque canebat uti magnum per inane coacta
Semina terrarumque, animæque, marisque fuissent,
Et liquidi simul ignis: ut his exordia primis
Omnia, et ipse tener mundi concreverit orbis.

For how the elements of continents,
Of vital air, and sea, and liquid fire
Had been collected through the mighty void ;
And how from those same elements there grew
Beginnings all, and Earth's own slender round,
All these in pleasing numbers told he of.

From the notions of vastness, oneness, fluidity, and turbulence, connected with the word in its original sense, the transition of Pontus to a terrestrial ocean or large sea was natural and easy of application. It may be, too, that there is a connection in Latin between pontus and pons, the idea being that an incandescent globe was a transition stage or bridge between the totally unknown form of matter that preceded, and the well-known that was to follow. The conjecture is strengthened by the Greek γέφυρα, the derivation of which (γέα φυράω "matter mixed with moisture") brings us back to the same idea of vaporous incandescence that actuated the formation of the Latin pons ; as also by Homer's using the word Ἐφύρη, II. VI. 152, to denote this transition phase of earth. It can only be in

this sense that *pontifex* signifies "bridge-maker,"—Plutarch calls the derivation from *pons* an absurd one. If, however, we take *pontus*, the word would signify "the light-maker," and *pontifex maximus* would thus be the exact and suitable equivalent of the Greek *Hierophant*. Earth's reckless dissipation of heat and light into an outer space that with chilling impassibility received all and gave back nothing, could not, did not last for ever. Long as it was coming—more than 50 millions of years, if we place credence on conjectural calculations—the day of reckoning arrived, as the geological narrative tells us, when insolvency stared it in the face, when it could no longer queen it with the brightest of celestial denizens, and was compelled, possibly for its own welfare, to take its station in the humbler walks of being. Figuratively and literally it woke one morning to find its property in liquidation, and itself, when all just debts were settled, in the condition of mostly planet, partly star; that is to say, in a condition resembling that which is supposed to prevail at present in our furthest planets, Jupiter, Saturn, Uranus, and Neptune. It had still an emblazoned scutcheon, it is true; but the motto was no longer "Incandescence;" it was now "Igneous fluidity," and such it retained for many a long, long day. While insolvent, it was not bankrupt quite, and Geology has taken the following inventory of its assets at this period of its career. It had, first of all, the cherished memory of the past; it had also, as a modest independence, a volume sufficiently large, if we include its envelopes, to reach the moon; a well-defined spherical form with an inclination to assume that of an oblate spheroid; movements of rotation and translation; heat of its own sufficient to fuse the most refractory of metals; and a residuum of inherent light, enough possibly to make it still appear as it were a sun to the moon, if moon there was, and if there were no dense canopy of clouds between the two to interfere.

A goodly portion in its way, after all, was this that was saved from the wreck, and had Earth only hoarded it with economy the famous Golden Age of traditional history

would yet be in existence. But Mother Earth was ever liberal and generous, and she still continued lavishing both heat and light upon spendthrift space till such time as she had spent much of the former and all the latter, and till herself was left the semblance of what she is to-day. But this is anticipatory, and so we return to a more minute description of Earth in its liquid or fluid igneous condition, or, as it might well be called, the decadence of the incandescent stage.

A most curious and interesting condition it was, however we regard it, since we find the globe proper in a thoroughly molten condition throughout, a veritable sea of liquid fire, such as we are inclined to believe the interior of its mass is to-day. Not a drop of water or of air was there on or close to the glowing orb ; and yet the measures of all our oceans, seas, and rivers, of all our atmospheres, were in existence, but thousands, hundreds of thousands of miles above. And even there they existed but as elementary gases—oxygen, hydrogen, nitrogen, and carbonic acid, mere phantoms of themselves and all aflame, thus attesting their descent from the paternal Pontus. And between those far-away regions and Earth's fiery furnace below was a mass of incandescent vapour filling the entire space, growing denser, heavier, darker and more opaque, as it approached the confines of our globe. And in it were the measures of all our coal beds, of all the salt in our mines and oceans, of all our chalk cliffs and common clay, and the earthy constituents of every plant and animal that was to occupy our globe ; of even the very metals, copper, iron, silver, gold, and the many others that are now embowelled in the depths of the earth. These too, like the water and the air, were but phantoms of what they were to be, reduced as they were to vapour by the intense fire below and by their own inherent heat, that was continuously fanned into fresh energy by friction of the particles and by the tempestuous surging of the mass.

What then was left for the globe proper ? Fire, liquid fire at a white heat ; the same that is now belched from an

Ætna and a Vesuvius, the same that vomited itself again and again from below in Archæan time to rupture the first crust that formed on the molten surface, to rear above and overflow the crust, and subsequently to cool into the primal granite that lies at the base of the lithological structure.

Was ever anything stranger or more mythical than this? And yet it is the conclusion, the only rational conclusion arrived at and acknowledged by the sober, practical science of to-day. An encyclopædic writer tells us that "the oxygen which now forms fully half of the outer crust was originally doubtless part of the atmosphere. So, too, the vast beds of coal found all over the world in geological formations of many different ages, represent so much carbonic acid once present in the air. The chlorides in the sea likewise were probably carried down out of the atmosphere in the primitive condensation of the aqueous vapour."

In the same strain writes every geologist who touches on the subject, and especially Figuier, from whose "World before the Deluge" we quote at length.

"At this excessive temperature the gaseous mass which we have described would be borne in space much as the sun may be supposed to be, and it would shine with the same brilliancy with which, in our eyes, the fixed stars and planets burn in the serenity of night. . . . As it got cooler, it gradually transposed portions of its warmth to the glacial regions of the interplanetary spaces, in the middle of which it traces the line of its flaming orbit. Consequent on its continual cooling, but at the end of a period of time of which it would be impossible, even approximately, to fix the duration, the star, at first gaseous, would reach its liquid state. . . . If it did not follow, as a consequence of the partial cooling down of the terrestrial mass, that all the gaseous substances composing it should pass into a liquid state, some of these would remain in the state of gas or vapour, and would form round the terrestrial spheroid an envelope or atmosphere. We shall not have formed a very inexact idea of the atmosphere which surrounded the globe at this remote period if we compare it with that which surrounds us now ; but the

extent of atmosphere which surrounded the primitive earth must have been immense; it doubtless reached the moon. It included, in short, in the state of vapour, the enormous mass of waters which now, in their condensed form, constitute the mighty ocean, added to other substances which preserved their gaseous state at the temperature then exhibited by the incandescent earth, and it is certainly no exaggeration to place this at 2,000° Centigrade. The atmosphere would participate in this temperature and, acted on by this excessive heat, the pressure that it would exercise on the earth would be infinitely more considerable than that which it exercises at the present time. To the gases which form the component parts of the air—namely, azote, oxygen, and carbonic acid gas—to the enormous masses of watery vapour, we should have to add vast quantities of mineral substances, metallic or earthy, reduced to the gaseous state, and maintained in that state by the temperature of this gigantic furnace. The metals, the chlorides—metallic, alkaline, and earthy, the sulphurets, and even the earthy bases of silica, of alumina, and of lime; all at this temperature would exist in a vapoury form in the atmosphere surrounding the primitive globe. It is thought that, under these circumstances, the different substances composing the atmosphere would be ranged round the globe in the order of their density: the first layer—that nearest to the surface—being formed of the heavier vapours, as the metals, iron, platinum, copper, mixed doubtless with clouds of fine metallic grains produced by the partial condensation of their vapours. This first and heaviest zone, and the thickest also, would be opaque, although the surface of the earth was still at a red heat. Next in order would come the more vaporisable substances, such as the metallic and alkaline chlorides, particularly the chloride of sodium or marine salt, of sulphur and phosphorus, with all the volatile combinations of these substances. The upper zone would contain matter still more easily vaporised, such as watery vapour or steam, united with bodies naturally gaseous, as oxygen, azote, and carbonic acid. This order of

superposition, however, would not maintain itself constantly. In spite of their unequal density the three atmospheric beds would often be mixed, producing formidable storms, violent ebullitions; throwing down, tearing, upheaving, and confounding these incandescent zones. As to the globe itself, without being so much agitated as its fiery and mobile atmosphere, it would be no less the prey of perpetual storms, occasioned by the thousand chemical processes which were in action in its molten mass. On the other hand the electricity resulting from those powerful chemical operations, conducted on a scale so unlimited, would provoke frightful detonations, the echoes of thunder adding to the horror of this primitive picture."

Such, then, was the condition of our world under Pontus and Gæa, and it is well to bear in mind that the change from incandescence to igneous fluidity did not occur all suddenly, but slowly, almost imperceptibly, and from the very first; and that only at an advanced stage of incandescent decadence would the following summary—and it is well to note it—be pronouncedly applicable:—

1. An outermost zone where the constituents of water, oxygen and hydrogen, were most abundant.
2. A more or less dense mass of luminous elastic vapour, the product of all the other elements, metallic and non-metallic, reduced to the gaseous state by heat, reaching from earth to heaven, and frequently disturbed by violent commotions.
3. The earth proper, a globe of liquid fire, and then as always, even to-day, presenting for reflection an exterior surface, and an interior beneath the surface.
4. The never-ceasing, inseparable tendency to form and arrangement in every part of the mass, individually and collectively.

It is well to note them, we repeat, for each in its own way was the offspring of incandescent matter; and Mythology tells us that five children—Nereus, Thaumas, Phoreys and Ceto, and Eurybia—were born to Pontus and Gæa.

CHAPTER III.

THE BIRTH-PLACE, BIRTH, AND COMING OF THE SEA.

Nereus.—"When the world was incandescent," writes Gunning in his "Life History of our Planet," "the oceans were not *on* but *above* the earth. No matter has been added, save in the fall of meteorites, and none has been taken away. The waters were here from 'the beginning,' here in their elemental gases. As silica is the oxide of silicon, and implies a time when its elements were free, so water is the oxide of hydrogen, and implies a time when its elements had not combined."

How those elements of oceans came to be *above*, Figuiet has already described. Let the same writer tell how the world of waters was translated from heaven to earth.

"As the globe continued to cool, a time arrived when the temperature became insufficient to maintain in a state of vapour the vast masses of water which floated, suspended and vaporised, in the atmosphere. These vapours would pass into the liquid state, and now the first rain-drops fell upon the earth. Let us here remark that these were veritable rain-drops of boiling water ; for, in consequence of the very considerable pressure of the atmosphere, water would be condensed and become liquid at a temperature very superior to 100° Centigrade. . . . The first water which fell in the liquid state upon the gradually cooling surface of the earth would be rapidly reduced to steam by the elevation of its temperature. Thus rendered much lighter than the surrounding atmosphere, these vapours would rise to the utmost limits of the upper atmospheric zone : thus circumstanced, they would radiate towards the glacial regions of space, and, again condensing, would thus again descend to the earth in a liquid state, to reascend as vapour and fall again in a state of condensation. But these

alternate changes in the physical condition of water could only be maintained by a very considerable temperature on the surface of the globe, which these alternations of heat and cold were very rapidly diminishing: the excess of heat was being dissipated in the regions of celestial space. This phenomenon extending itself by degrees to the whole mass of watery vapour existing in the atmosphere, the waters in increasing quantities covered the earth; and as the conversion of all liquids into vapour is provocative of a notable disengagement of electricity, a vast quantity of electric fluid necessarily resulted from the conversion of such masses of water into vapour. Bursts of thunder and bright gleams of lightning were the necessary accompaniments of this extraordinary struggle of the elements. How long did this struggle for supremacy between fire and water, with the incessant noise of thunder, continue? All that can be said in reply is, that a day came when water was triumphant. After having covered to a vast extent the basins and hollows of the earth, it finally occupied and covered the whole surface: for there is good reason to believe that at a certain epoch, at the commencement, so to speak, of its evolutions, the earth was covered by the waters in its whole extent. Ocean was universal."

When now we turn to the Mythological narrative, it seems almost superfluous to point out the identity between our sea, the first product of incandescence, that originally affected the hollows of our globe, and subsequently covered the greater part of its expanse,—and between *Nereus*, the eldest born of Pontus, who loves peculiarly the hollow depths of ocean, and who is described by every classic poet as *the Sea*. Neptune is the ruler of *water in all its three forms*, solid, fluid, and gaseous, and his symbol, the *trident*, is indicative of such authority: Pontus is the vast expanse, *the sea as contrasted with the sky*, as is well evidenced by the following quotations:—

Jamque mare et tellus nullum discrimen habebat,
Omnia pontus erant. Deerant quoque littora ponto.

Ov. Met. 291.

Postquam altum tenuere rates, nec jam amplius ullæ
Apparent terræ, cœlum undique et undique pontus.

Æn. III. 192.

But Nereus is the true, the real sea of earth, *the sea as contrasted with the land*. Virgil testifies to his origin and translation from heaven to earth in the sixth Eclogue. After writing the lines already quoted in connection with Pontus, we find—in immediate order of succession, too—these words :—

Tum durare solum et discludere Nerea Ponto
Cœperit, et rerum paullatim sumere formas.

Then, how the surface essayed to condense,
From Pontus Nereus to separate,
And forms of being slowly to assume.

The derivation of Νηρέυς (*νη-ρέω* “not changing”) is expressive, for with the first drop of water that formed on the outer atmospheric zone, and that did *not change to vapour*, was Nereus born, however long he may have subsequently been before coming to his kingdom upon earth. And when he did come, he proved himself still further entitled to the name he bears by (*νη-ρέω*) not flowing off the surface of our globe,—a wonderful thing in itself, even when explained by gravity,—and by remaining unchanged (*νη-ρέω*) during all geologic cycles in contradistinction to the solid land which, during those cycles, has been repeatedly moved upwards and downwards. It is probable, too, that his name has been commemorated in our own language, for what is “rain” but Nereus transposed?—*ρηνέυς*. Hesiod’s description runs thus :—

Νηρέα δ’ ἀφευδέα καὶ ἀληθέα γείνατο Πόντος,
πρεσβύτατον παίδων· αὐτὰρ καλέουσι γέροντα,
οὔνεκα νημερτῆς τε καὶ ἥπιος, οὐδὲ θεμιστέων
λήθεται, ἀλλὰ δίκαια καὶ ἥπια δῆνεα οἶδεν.—Theog. 233.

Of Pontus born was Nereus, the true,
The real, eldest of his children all ;
And him they style “the Old,” since ever he,
The same and soft, forgets not nature’s laws ;
But measures all, the strict and fair, he knows.

NOTES.

- 1 ἀψευδέα.—“These were veritable rain-drops,” says Figuier.
- 2 πρεσβύτατον.—“When the earth and its atmosphere had cooled to the dew point, condensation occurred. Oxidation, the combination of oxygen and hydrogen, must have occurred before.”—*Gunning*.
- γέροντα.— “Look how the gray, old ocean
From the depths of his heart rejoices.”—*Lowell*.
- 3 νημερής.—“unerring, not deviating, the same.”
“Thou art the same, eternal sea!
The earth hath many shapes and forms,
Of hill and valley, flower and tree.”—*Lunt*.
- ἥπιος.—“Soft,” that is, “impressible, yielding.”
“Roll on, thou deep and dark blue ocean—roll!
Ten thousand fleets sweep over thee in vain.”—*Byron*.
- 4 ἡνεα οἶδεν.—The sea has witnessed all and every change that has convulsed and altered earth and its boundaries from the beginning.

As to the power assigned Nereus of appearing in different shapes to mortals, we have only to remember that the sea has many moods and forms. It may be calm or tempestuous, cerulean, dark, phosphorescent, &c.; it may be transformed to vapour, or solid as the berg. And as to his prophetic power there can be no question of doubt. His oracular responses are still extant and bound, not in cloth or leather it is true, but bound in rocky covers. Our earth is the book; its foliated structure the leaves; and ripple marks, rain-prints, sun-cracks, raised beaches, terraces, shells, coal, chalk, lake deposits, diatom mud, calcareous and siliceous ooze,—all these and others are the prophetic characters inscribed, indelibly inscribed, upon the leaves and capable of being deciphered. Ocean has taken the mollusk for a text and prophesied to the mailed ganoid and the placoid of the Devonian Age; these in their turn served him as a homily for the reptile; it for the mammal; all of them combined for pre-diluvian man:

“Oh! how old
Thou art to me! For countless years thou’st rolled;
Before an ear did hear thee, thou didst mourn,
Prophet of sorrow, o’er a race unborn.”—*Dana*.

The calm of ocean is even more awesome than its turbulence. There are times when nought is visible but a glassy expanse of waters, and when, perhaps

“The sky
Spreads like an ocean hung on high,
Bespangled with those isles of light
So wildly, spiritually bright.”

It is at such moments, with infinity all round, that the soul is most apt to commune with itself, and be startled by the prophetic warnings of a guilty conscience. It must have been such a sea and such a night that came for Priam's son when sailing o'er the main with Grecian Helen :

Pastor quum traheret per freta navibus
Idæis Helenen perfidus hospitam,
Ingrato celeres obruit otio
Ventos, ut caneret fera
Nereus fata.

Hor. Od. I. 15.

CHAPTER IV.

THE RIVERS OF THE SEA.

Νηρῆος δ' ἐγένοντο μεγάρτα τέκνα θεάων
πόντῳ ἐν ἀτρυγέτῳ καὶ Δωρίδος ἠῦκόμοιο,
Κούρης Ὀκεανοῖο, τελέεντος ποταμοῖο.—Theog. 240.

Of Nereus and the fair-haired Doris, child
Of Oceanus, of the perfect stream,
There was begotten in the liquid deep
A passing lovely race of deities.

THE sea is wedded to this Doris, to the (ὕδωρ) water of aqueous vapour that remains invisible above till condensation occurs and sends it down from the gaseous ocean above to the sea below, whence again it is raised by evaporation to descend once more. And this process "has never ceased since the first shower of rain fell upon the earth." Largely raised as it is from the ocean surface, it falls back directly upon that surface, and that portion of it which falls on land finds its way eventually through the brooks and rivers that it feeds, to the bosom of the sea. "All the rivers run into the sea; yet the sea is not full: into the place from whence the rivers come, thither they return again."—Ecclesiastes.

One of the most interesting circumstances connected with the ocean is the circulation of its waters. In the first place we have a general drift, or set of the warmer and lighter waters flowing on the surface towards the poles, and of the colder, heavier waters of those arctic regions flowing underneath the warmer towards the equator. In addition to this general drift both ways, there are found to be immense currents, "the rivers of the sea," as they have been aptly called, which traverse the ocean in all directions and at different depths, and of which the well-known Gulf Stream is a type. "There is," says Maury, "a river in

the ocean. In the severest droughts it never fails, and in the mightiest floods it never overflows. Its banks and its bottoms are of cold water, while its current is of warm. The Gulf of Mexico is its fountain, and its mouth is in the arctic seas. There is in the world no such majestic flow of waters." Besides the Gulf Stream, there is a great Equatorial Current crossing the Atlantic from Africa to Brazil, where it divides, one part going southwards, the other northwards to the Gulf of Mexico, then to continue as or to feed the Gulf Stream. The Indian Ocean has its own currents and its own Gulf Stream, one that runs from the Straits of Malacca northwards to China and Japan, and thence across the Pacific towards north-western America. The Pacific has its own currents ; so, too, probably have the Polar Seas, and every great inland sea connected with the ocean.

Those currents play an all-important part in tending to equalise the temperature of the ocean in all latitudes, and in modifying to a considerable extent the climates of different regions. They are furthermore connected closely with all that concerns navigation, trade, commerce, and civilisation in general. In the ocean itself, too, they must play an important part, seeing that they have much to do with the fretting and abrasion of the coasts and cliffs, with the transportation to deeper water of the débris from those sources, as also of that carried by every river to the ocean, and with the friction, comminution, and wide-spread diffusion over the sea-bottom of all terrigenous deposits. "The rock-forming materials," says a writer, "are spread out far and wide by the numerous ocean currents, some of which flow for hundreds of miles ; and so the bed of ocean can be very slowly raised by their accumulations."

It must have been long since evident that those currents, in the sea and born of the sea, are the Nereides of Mythology, born of Nereus, as their name denotes, and of the aqueous vapour's water that descended to the sea from time immemorial. They, like those ocean currents, are many in number, propitious to sailors, and worshipped in the seaports of every country. Well do they deserve our

culture and all the altars built to them in the shape of wharves, docks, and lighthouses. Were it not for those rivers of the sea, or for such of the Nereides as are embodied in the Gulf Stream, we are told on good authority that London would have a mean annual temperature 40° lower than it has, and that much of Europe would be placed under glacial conditions.

Their numbers and names are not the same with all writers. Hesiod mentions 50, Homer 34, and Apollodorus 45. Even in a casual and hasty examination such expressive names are noticed as Proto, "the surface"; Sao, "the saver"; Galene, "the tranquil"; Pherousa, "the transporter"; Enagore, "the collector"; Lysianassa, "the dissolver, or comminator"; Euarne, "the strewer"; down to the lowest depths of ocean, to Nemertes, "the unchanging," ἡ πατρὶς ἔχει νόον ἀθανάτοιο. Hesiod finishes the enumeration thus:

αὐται μὲν Νηρῆος ἀμύμονος ἐξεγένοντο
κούραι πεντήκοντα, ἀμύμονα ἔργα ἰδυῖαι.

From open sea there sprang those fifty maids,
Witnesses of the works exposed to view.

There arises the not improbable idea that a well-systematised effort was made by Hesiod, if not by the other writers too, to represent in regular order from surface to bottom the most striking characteristics of the different marine strata as to colour, motion, density, solvency, and deposition. Considering also that there is a general drift of upper waters towards the poles, and of lower waters towards the equator—that is to say, of a mass of warm water overlying one of cold—it is suggestive, to say the least, that if we draw a dividing line between the forty-five Nereids mentioned by Apollodorus, we will have for the twenty-third Ἀλιμύδη, "the guardian of the deep"; and if we draw a similar line between the fifty of Hesiod, we will have for the twenty-fifth Δωρίς, "water" or "a gift," preceded by Πρωτομέδεια, "the guard of the surface"—the division, as it were, between the warmer upper and the lower cooler currents.

CHAPTER V.

THAUMATURGY.

Thaumas.—The atmosphere is always more or less charged with electricity, due in part, it is said, to evaporation going on over the oceans, in part to other causes not well understood yet. Of the precise nature of electricity itself we know very little. "It is neither matter nor energy," says Thompson; "yet it apparently can be associated or combined with matter; and energy can be spent in moving it." All that we know with regard to it is that which is derived from its manifestations, from the effects which it produces; and that some of its sources are friction, percussion, vibration, disruption and cleavage, evaporation, pressure, heat, chemical action, contact of dissimilar substances, &c. If all these sources are potent for electric manifestation to-day, how much more so must they have been at that stage of our igneous globe when the rain rushed for the first time upon the earth through the heated vaporous zone that then served for atmosphere? The conditions for electricity were all there, and in an intensified degree; the heat and pressure were enormous, the atmosphere was loaded with dissimilar substances, matter had not advanced beyond the initial stage of molecularity, there was abundance of disruption and chemical action, and especially was there constant friction from the uprise of intensely heated steam and the downfall of the comparatively colder rain, the two forming, as it were, an endless revolving band of contraries around the blazing orb.

Figuiet has already testified to the excessive electrical disturbances that came into being in those early days of Earth. Another writer, Winchell, in his "Sketches of Creation," writes to the same effect: "A scene of terrible

sublimity approaches. As yet no water existed upon the earth. No rain had fallen upon the parched and blackened crust. All the water which now fills the oceans and the rivers and the lakes,—all which saturates the atmosphere and the soil, and the rocks,—rested then upon the earth as an acrid, elastic, invisible vapour, extending to an unknown distance into surrounding space. This vapour was not cloud-like, but intensely hot and transparent. . . . The time had now arrived, however, when the remoter regions to which this aqueous gas extended began to be so far reduced in temperature as to cause condensation to begin. . . . Particle drew particle to itself, and rain-drops began to precipitate themselves through the lower strata of the fervid atmosphere. In their descent they were scorched to evaporation, as the meteor's light vanishes in mid-heaven. The vapours hurrying back to the bosom of the cloud were again sent forth, again to be consumed. At length they reached the fervid crust, but only to be exploded into vapour and driven back to the overburdened cloud which had an ocean to transfer to earth. The clouds poured the ocean continually forth, and the seething crust continually rejected the offering. The field between the cloud and the earth was one stupendous scene of ebullition. But the descent of rains and the ascent of vapours disturbed the electricities of the elements. In the midst of this cosmical contest between fire and water the voices of heaven's artillery were heard. Lightnings darted through the Cimmerian gloom, and world-convulsing thunders echoed through the universe."

If we are thus forced to have cognisance of electricity only through its *manifestations* or the *phenomena* produced, we can understand why Mythology assigned the name of *Thaumas* to the same phenomena, inexplicable and wonderful (*θαῦμα*) as they are. It is, indeed, from the kindred *θάμβος*, "wonder," that we must derive "amber," the first substance, so far as we know, in which electrical properties were discovered. If, however, we seek a derivation for *Thaumas* (and it is only rational to suppose that all emotions must have had entities to give them their nomen-

clature), it may be probably found in a dual sense. The word is written $\theta\alpha\upsilon\mu\alpha$, $\theta\omega\mu\alpha$, and $\theta\acute{\omega}\upsilon\mu\alpha$, and this last, the Ionic form, is suggestive of $\theta\acute{\epsilon}\omega\ \delta\mu\alpha$ ($\delta\sigma\mu\alpha$) "swift-falling rain," (and it is well to note that $\theta\acute{\epsilon}\omega$ is used to especially denote *circular* motion, or that which runs round into itself), and $\theta\acute{\upsilon}\omega\ \delta\mu\alpha$, "burning vapour." We would thus be brought back to the original conditions—to the conditions, indeed, that maintain to-day—for the production of electricity, namely, the descent of cooled vapour and the ascent of heated. When we turn to Electricity, or the Electra of Mythology to whom Thaumias was united, we have, in the first place, the conviction derived from the similarity of names. It is also to be noted that she was the daughter of Oceanus (aqueous vapour), and is thus connected closely with the same evaporation which we consider so potential in influencing electricity. That the name Electra is derived from $\eta\lambda\epsilon\kappa\tau\rho\upsilon\alpha$, "electron" (either amber or a precious metal) is improbable; the reverse is more likely. Lightning, the most evident manifestation of electricity, would also be the first to be observed, reflected on, and named. The most characteristic and striking form of lightning would be the zigzag, and Electra ($\epsilon\lambda\epsilon\kappa\tau\rho\alpha$), allowing for the metathesis of ρ , would signify ($\acute{\alpha}\lambda\eta\ \rho\acute{\alpha}\kappa\tau\eta$) "the wandering and the broken"—that is, forked lightning.

CHAPTER VI.

"IRI, DECUS CÆLI."

Iris.—The identity of *Iris* with the rainbow is too well established to admit of doubt. She is the "*Iri, decus cœli*" of the classic, and the "Triumphal arch, that fill'st the sky" of the modern poet.

There appears, however, to be a discrepancy between her mythical and her modern parentage, for while both Mythology and Science agree with regard to one side of the ancestral house, namely, *Thaumas*, or the rain in transit, they disagree as to the other. *Hesiod* assigns *Electra*, or electric influence; Science asserts that it is the rays of the sun. If the former be correct, then we would be led to infer the presence of an unusual amount of electricity in the atmosphere previous to the exhibition of rainbows; if Science be altogether right, the question naturally crops up why, with the quite common presence of two such factors, rain and sun, we do not see rainbows oftener than we do. Be this as it may, the Latin poets were evidently inclined to look with suspicion on the female side of the genealogical tree. *Iris* is always mentioned by *Virgil* and *Ovid* with the paternal appellation of "*Thaumantias*": *Electra* is never alluded to. That their theories in regard to the formation of rainbows were similar to our own is evident from the following quotations:

Qualis ab imbre solet percussus solibus arcus
Inficere ingenti longum curvamine cœlum.

Ov. Met. VI. 63.

As when the rainbow, struck by sunny rays,
Spans the wide heaven with its mighty arch.

Cui nubibus arcus
Mille jacet varios adverso sole colores.—Æn. V. 88.

As when the rainbow, opposite the sun,
A thousand intermingled colours throws,

Ergo Iris croceis per cœlum roscida pennis,
 Mille trahens varios adverso sole colores,
 Devolat. Æn. IV. 700.

With saffron wings then dewy Iris flies
 Through heaven's expanse, a thousand varied dyes
 Extracting from the sun, opposed in place.

Does Iris bear a message? It would be difficult to deny the fact. To the observant shepherd, the weatherwise sailor, to the scientific meteorologist, it brings a warning of what may occur, of storm and rain if seen in the morning, of calm and fair weather if beheld in the evening. To the human race as a whole it brings a reminder of the last great cataclysm that convulsed our earth, and an assurance of an everlasting covenant between Creator and post-diluvian beings that "the waters shall no more become a flood to destroy all flesh." It is thus impossible for the religious or scientific mind to separate the purely physical emblem from the event which that emblem indicates; and hence it is that Iris may be considered as the rainbow, or the rainbow as but the path on which she travels. In the same way, for example, may we consider the apices of an indefinite number of right angles and a semicircle as one and the same, or the semicircle as but the path described and brought into being by the motion of a right angle having the diameter of a circle for hypotenuse.

It is in this dual sense—physical and portentous—that Iris is introduced in classic poetry, and the distinction, subtle as it is, is always more or less implied. Even in the name is this the case, for *Ἴρις* is derivable from *εἶρω*, which has the dual meanings of "to join or fasten in rows," as the colours in the rainbow; "to speak, to announce."

She is described as the peculiar attendant and messenger of Juno (the dry land), because the elevation of the mountains has a very approximate ratio to the altitude of the cloud-bearing and storm-producing strata of the air. But before she became the special favourite of the land upon our globe, there were days when she was selected for a more portentous mission. While the sea has been unchangeable, not so the land. Often and often in geologic time has it gone down on a large scale beneath the waters. Such occa-

sions, as Hesiod tells us later on, were not comparatively often; but when they did occur, when each age had run its round, evolved itself probably to the furthest point it could, and was then found lacking in the essentials of developing the progress marked out in the grand scheme of creation, the formations of such age were doomed, the *bond* was broken, and they passed away in the convulsions of nature to give place to others and to better. How were these convulsions produced? Chiefly by volcanic disturbances; and the rocks bear testimony of the fact in the unconformability of their structure. There must have been atmospheric storms too in those days, when continental and insular gods went down and others took their place; there must have been signs and tokens of those storms—an Iris that arched the heavens and foretold to those recreant worlds that their race was run, an Iris that had been commissioned, by the Life that never died, to bring the erst cool waters in a golden bowl, and that *did* bring them in the steam which bubbled and rose from the golden crater of volcanoes roused to action, —steam in whose vapoury spray Iris herself may have appeared, as in that of a fountain, treading on the rainbow path.

It has been a matter of debate why Iris was selected by Virgil to cut the last tie that held the dying Dido to life. The reason may be twofold. First, to show that Dido by her own rash act had sundered the *covenant* between the Creator and the created. Secondly, to foreshow the tempest that cast Æneas on the shores of Sicily. The context shows that Dido perished in the early morning, and a rainbow in the morning foretells the storm and rain with which the 5th Book opens. For a similar reason is Iris introduced in the 2nd Book of the Iliad as a premonition not only of the stormy battles that were to come, but also of the covenant between the Greeks and Trojans that was subsequently broken by the arrow of Pandarus. Ovid, also, when describing the deluge of Deucalion, introduces Iris as significative of the disaster that was to come and of the covenant destroyed by the wickedness of Lycaon.

CHAPTER VII.

THE PIRATES OF THE AIR.

Harpies. Θαύμας δ' Ὀκεανοῖο βαθυρρέϊταιο θύγατρα
 ἡγάγετ' Ἠλέκτρην· ἥ δ' ὠκείαν τέκεν Ἴριν,
 ἡὔκόμους θ' Ἄρπυϊας, Ἀελλῶ τ' Ὠκυπέτην τε,
 αἱ ρ' ἀνέμων πνοιῇσι καὶ οἰωνοῖς ἅμ' ἔπονται
 ὠκείης πτερύγεσσι· μεταχρόνιαι γὰρ ἕαλλον.—Theog. 265.

But Thaumas chose Electra for his spouse,
 Of the deep-flowing Oceanus child ;
 She bore swift Iris, fair-haired Harpies too,
 Aello and Ocypete, that rush
 On pinions swift, followed by gales and birds ;
 For after time of Kronos came they forth.

THERE came a day, we are assured, when the rain from above established itself as a thermal ocean upon the newly-formed crust. Thousands of years may have elapsed before the victory was gained ; but whatever was the length of time many other changes took place during the interval. Some of these were immediately connected with the atmospheric envelope. The constant and excessive downpour of the rain would not only unload the aqueous vapours upon earth, but would also wash down the mineral substances with which the atmosphere was weighted, and much of the acid and poisonous gases that permeated it. The air, thus purged and comparatively purified, and approximating more closely in character to what it is to-day, would offer an extended field for those aërial eddies than which there is nothing more appallingly phenomenal save perhaps the volcanic outbursts on earth below. The cyclones, hurricanes, tornadoes, typhoons, and all other revolving tempests, must have had a beginning, and the early days of the solid globe presented all the necessary conditions in an intensified degree. Modern research has shown that the

origin and growth of storms are naturally associated with the expansion of uprising moist air and the formation of clouds and rain. These associations were pre-eminently present in Archaic times; the air was still loaded with clouds and rain, the globe was much hotter than to-day, and radiating heat to outer space; there was very little land to interfere with the action of ærial currents, and from the vast thermal sea enormous quantities of warm, moist vapour were incessantly ascending and being met directly and laterally by cooler currents descending to supply their place. All the storm essentials, then, were present, and as the natural result we would have earth revolving in space for an indefinite period, girt with a "thermal sea" below, and with a "storm sea" above, that helped the ocean to demolish the blackened isles and crags which raised themselves for a brief while above the raging waters.

To those cyclones and other storm winds that suddenly carry off whatever opposes them, the name of Harpies is given in Mythology. The word, Ἄρπυιαι (ἀρπάζω, "to tear, rend, to carry off") is expressive of the effects produced. Their modes of action are visible in the particular names assigned them; thus Aello (ἄω εἶλλω), "the revolving wind, or cyclone;" Ocypete (ὠκύς πέτομαι), "the swift-flying, or hurricane;" Acholoë (ἀχλύω), "the darkener;" and Celæno (κελαιρός), "the black," whom Virgil calls "furiarum maxima," to denote that storms are ever presaged and intensified by blackened skies. Their primal abode, Salmydessus (Σαλμυδησσός), or Halmydessus (ἄλμυδησσός), evidently refers to the early days of earth, when its atmosphere was (ἄλς μύδος) a sea of damp, moist vapour, wherein the storm winds had full play, and lashed and tormented the blinded Phineus below, that is, the (φαίνω) visible land of an earth deprived of self-luminosity. As time rolled on, those revolving storms would no longer have control over earth's expanse, but would be confined to certain localities where the conditions for a *whirling motion* (στρέφω) would be most favourable—Strophades, from where not even the sons of Boreas could rout them. Still another, and

probably the true reason for the term Strophades is found in the fact that "the revolving tempests of the equatorial regions occur especially at the time of the *reversal* (στρέφω) of the regular winds," and this is denoted by the myth which mentions how the Harpies were pursued from Salmydessus by Zetes and Calais, the sons of Boreas, who did not *return* from the chase till they had reached the Strophades. Hesiod calls them children of Thaumas and Electra, and it is well known that cyclones, hurricanes, and other revolving storms are charged with electricity and often accompanied by sheets of driving rain. The following description of a cyclone by Reclus will best explain this, as also the general idea of the Harpies being winged beings who carried away whatever suddenly disappeared from the earth. "Some days before the terrible hurricane is unchained, nature, already gloomy and as if veiled, seems to anticipate a disaster. The little white clouds, which float in the heights of air with the counter trade-winds, are hidden under a yellowish or dirty white vapour; the heavenly bodies are surrounded by vaguely iridescent halos and heavy layers of clouds, which in the evening present the most magnificent shades of purple and gold stretching far over the horizon, and the air is as stifling as if it came from the mouth of some great furnace. The cyclone, which already whirls in the upper regions, gradually approaches the surface of the ground or water. Torn fragments of reddish or black clouds are carried furiously along by the storm, which plunges and hurries through space: the column of mercury is wildly agitated in the barometer and sinks rapidly; the birds assemble as if to take counsel, then fly swiftly away so as to escape the tempest that pursues them. Soon a dark mass shows itself in the threatening part of the sky; this mass increases and spreads itself out, gradually covering the azure with a veil of a terrible darkness or a blood-coloured hue. This is the cyclone, which falls and takes possession of its empire, twisting its immense spirals around the horizon. The roaring of the sea and skies succeeds to this awful silence.

“The progress of the wind experiences much more resistance in the interior of continents than on the seas, but the phenomena which are produced there during the hurricane are not less terrible. Buildings which occur in the path of the storm are razed to their foundations, the waters of rivers are arrested and flow back towards their source, isolated trees are torn up and plough the earth with their roots, the forests bend as if they formed but a single mass, and give to the tempest their broken branches and torn leaves. Even the grass is uprooted and swept from the ground. Innumerable fragments fly in the track of the hurricane, like the waifs carried away by a fluvial or marine current. Ordinarily, the action of electricity is added to the violence of the air in movement, to increase the ravages of the tempest. Sometimes the flashes of lightning are so numerous that they fall in sheets like cascades of fire; the clouds and even the drops of rain emit light; the electric tension is so strong that sparks have been seen, says Reed, to dart spontaneously from the body of a negro.”

The foregoing description of a cyclone's approach and onset is almost an amplified paraphrase of what Virgil writes in his *Æneid* with regard to the Harpies:—

Postquam altum tenuere rates, nec jam amplius ullæ
Apparent terræ, cœlum undique et undique pontus;
Tum mihi cœruleus supra caput astitit imber,
Noctem hiememque ferens, et inhorruit unda tenebris.

5 Continuo venti volvunt mare, magnaue surgunt

Aequora : dispersi jactamur gurgite vasto.
Involvere diem nimbi, et nox humida cœlum
Abstulit; ingeminant abruptis nubibus ignes.
Excutimur cursu, et cæcis erramus in undis.

10 Ipse diem noctemque negat discernere cœlo,
Nec meminisse viæ mediâ Palinurus in undâ.

Tres adeo incertos cæcâ caligine soles
Erramus pelago, totidem sine sidere noctes.
Quarto terra die primum se attollere tandem

15 Visa, aperire procul montes, ac volvere fumum.
Vela cadunt; remus insurgimus; haud mora, nautæ
Annixi torquent spumas, et cœrula verrunt.

- Servatum ex undis, Strophadum me litora primum
 Accipiunt: Strophades Graio stant nomine dictæ
 20 Insulæ Ionio in magno, quas dira Celæno,
 Harpyiæque colunt aliæ, Phineia postquam
 Clausa domus, mensasque metu liquere priores.
 Tristius haud illis monstrum, nec sævior ulla
 Pestis et ira deū Stygiis sese extulit undis.
 25 Virginei volucrum vultus, foedissima ventris
 Proluvies, uncæque manus, et pallida semper
 Ora fame.

III. 192.

When now our crafts possessed the briny deep,
 When disappears the land, and all around
 Is nought save sky and sea, then o'er my head
 Impending stood a purple cloud that bears
 Darkness and tempest, and the wave beneath
 Frowned with the horrors of Cimmerian gloom.
 The winds incessant move in spiral curves
 The sea's expanse, and raise stupendous waves.
 Tossed by the cyclone vast we're cast adrift.
 The lowering clouds involved the light of day,
 And reeking darkness blotted out the sky ;
 From the rent clouds the lightnings freely flash.
 We're driven from our course and roam at large
 Upon the giddy waves. Nor night nor day
 Can Palinurus' self discern in heaven,
 Nor on the high seas bear in mind the way.
 For three such days obscured by blinding mist,
 As many starless nights, we roam the deep.
 Land for the first time on the fourth is seen
 To raise itself, disclose the hills far off,
 And roll away the haze. The sails grow slack ;
 To oars we rush ; and quick, the sailors braced
 Toss the salt spray and sweep the azure depths.
 Saved from the waves, the Strophadean shores
 Receive me first: in the Ionian main
 Stand forth those islands dubbed with Grecian name,
 Which dread Celæno and the Harpy crew
 Take for a habitation when the house
 Of Phineus was closed, and leave they did
 Their erstwhile feasting places through alarm.
 Than these no dread phenomenon more dire,
 No bane more ruthless, and no scourge of gods
 E'er raised itself above the Stygian waves.
 Of things on wing the primal aspect's theirs ;
 The flux most boist'rous of a central vent ;
 Limbs that are curved ; and mouths e'er wan with greed.

NOTES.

- 5 *volutant mare*.—The cyclone above had communicated its eddying motions to the waters below.
- 6 *gurgite*.—The aerial and marine alike.
- 9 *erramus*.—A vessel tossed about in the eddies caused by a cyclone “has travelled 1,500 miles in 5 days, and yet at the end of that time was but 410 miles from the point of departure.”
- clausa domus*.—When earth was covered by a crust of some kind.
- 23-27.—The poet proceeds to enumerate the principal characteristics of revolving storms, namely, velocity, a central axis, spiral currents, and suction.
- 25 *volucrum*.—Cyclones move at a rate of from 50 to 100 miles an hour.
- ventris*.—“In severe storms there is always present a system of surface winds revolving about and blowing in towards a storm centre.”
- 26 *uncæ manus*.—“At a short distance above the earth’s surface is a system of outward moving spiral currents immediately above the lower inward moving winds.”
- 27 *pallida s. o. fame*.—There is hardly any limit to their powers of suction. The waters of the sea have been frequently observed to be drawn in, in greater or less quantity, by the vacuum which is formed in the midst of the whirlwind. In Barbadoes Reed saw showers of salt water fall at a great distance from the shore, and in such abundance as to destroy all the fish of the lakes and streams.

CHAPTER VIII.

THE KEEPER AND THE KEEP.

Phorcys and Ceto.—Hesiod, it will be remembered, when enumerating the offspring of Pontus and Gæa, began with Nereus, the eldest; that is, with water or the constituents of water placed originally, as we have seen, in the furthest confines of earth's atmospheric envelope. Continuing his narrative, the Greek poet says :

αὐτὺς δ' αὖ Θαύμαντα μέγαν καὶ ἀγήνορα Φόρκυν
Γαίῃ μισγόμενος καὶ Κητῶ καλλιπάρηον,
Εὐρυβίην τ' ἀδάμαντος ἐνὶ φρεσὶ θυμὸν ἔχουσιν.—Theog. 237.

Backward and backward still with Gē conjoined,
Great Thaumās bore hē, Phorcys well-defined,
The blushing Ceto, and Eurybia too
With adamantīne spirit in her breast.

NOTES.

- 1 ἀγήνορα.—ἀγήνωρ, Dor. ἀγάνωρ, signifies literally (ἄγαν ὁράω) “much seen, very much seen, too much seen,” owing to the varied constructions of ἄγαν. It is in this way that the term has been applied in the sense of “manifest, conspicuous, very conspicuous,” to an Achilles; and of “too manifest, too conspicuous, barefaced,” to Thersites and the wooers of Penelope.

There is nothing pleonastic or superfluous in the words “αὐτὺς δ' αὖ.” They bring the reader from the confines of the incandescent orb where our oceans were conceived *down* to the aërial regions where such phenomena as electricity, the rainbow, and mighty storm winds hold sway; and still *further down* to where those new characters, Phorcys, Ceto, and Eurybia are situated. If we look back at the tabulated summary of existing conditions at the conclusion of Pontus and Gæa, we see plainly how Nereus and Thaumās are respectively applicable to those marked (1) and (2). Eurybia will be treated of when we come to her consort,

the Titan Crius ; but even as it is, the name is sufficiently suggestive of "diffused force" to connect her with that marked (4). If then the offspring, as a whole, be consonant with the specified conditions as a whole, it naturally follows that the mythological remainder must be the equivalent of the scientific one,—that is to say, Phorcys and Ceto must represent the conditions marked (3). Everything with regard to them is confirmative of this conclusion. They end the "αὔρις δ' αὖ" of Hesiod's *material* beings, just as earth proper ends the material zones into which the incandescent globe arranged itself: they are the children of Pontus and Gæa, as the diminished igneous globe is of the larger incandescent: they are brother and sister and united in wedlock, as the exterior and interior of our orb are close kin to one another and inseparably united. Nor is this all; the very names breathe conviction. Phorcys (Φόρκυς) is (φάω ἔρκος) "the visible boundary"; while Ceto (Κητώ) is but Doric for Κάτω, "underneath"; so that the two deities are emblems respectively of *the exterior* and *the interior* of the orb. The epithets ἀγήνορα and καλλιπάρηον applied to them respectively by Hesiod accentuate both the derivation and interpretation. Phorcys, the exterior surface, is "well seen, well defined"; Ceto, that which is beneath the surface, is "blushing," to denote the glowing heat of our orb in those days—days when Phorcys was a mighty potentate who held sway over earth's expanse. He, like others of the older deities, was shorn in time of much of his dominion, obliterated as he was by his Gorgon child, Medusa, as she was by her offspring Chrysaor, and he by his descendants. But he still retained a portion,—in the sea whose exterior surface, unlike that of land, has never changed. There, though under the control of Neptune, he is the marine Phorcys who generates the clouds, and controls the surface play of the waters, beneath which, as in a ring, the "Nereidum, Phorcique chorus" exercise their functions. As he holds the surface, so does his partner Ceto hold the depths of ocean, where the whales and monsters of the sea disport.

CHAPTER IX.

THE GRAY FROM BIRTH.

Graie.—How old are the clouds? They *precede* the formation of rain in these our days; but in view of their being but the elastic invisible vapour of water made visible by condensation and cold, we must suppose this invisible vapour as antecedent in point of time. Were there no vapour, there would certainly be no clouds. This is pointed out in Mythology by saying that Nereus was the eldest born of Pontus and Gæa, and in science by the assertion that “oxidation must have preceded condensation.”

Whether the elemental rain was so constituted as to be capable of falling without any previous condensation into cloud is even within the range of possibility, taking into account the abnormal condition of all existing things in the primal age of earth, and from the fact that rain falls, though rarely, from a clear and cloudless sky. If condensation did occur it might be caused either by cooling from space without, or by cooling from a diminution of the heat from the surface of the earth below. The latter is equally probable with the former, more likely indeed, as the orb was constantly losing heat; it is more consistent with our theory of the cloud-making of to-day, and is certainly the opinion entertained by Mythology, which says that the Graiæ were children of Phorcys and Ceto, that is, of the orb below.

True aqueous vapour is invisible and always present in the atmosphere. Rain is aqueous vapour condensed sufficiently to make it fall in drops. Cloud is intermediate between these two, since it is visible like rain, but suspended in the air like vapour. If close to the

surface this visible vapour is generally called mist or fog ; if high up, clouds.

Endless though the forms of clouds be, there are three principal ones, namely, Cirrus, Cumulus, and Stratus. Of these the Cirrus is curled in appearance and the most elevated, so much so that its particles are supposed to be made up of minute crystals of ice or snow. The Cumulus, "the cloud of day," is mountainous-like in appearance, having above a bossy top that often becomes Cirrus, and below a horizontal base that stretches sometimes into Stratus.

This last, "the cloud of evening," is lowest in situation, and comprehends the mists and fogs.

That the Graiæ are but the Clouds personified admits of little doubt, even without going further into explanation. Like the clouds they are emanations from Phorcys and Ceto, from the upper and under parts of earth, and especially from the former, as they are always genealogically alluded to as "Phorcydes"; like the clouds they are close akin to our globe, with which the Gorgons will presently be identified; like the clouds they are three in number; but above all, like the clouds are they "gray—gray from birth," ἐκ γενετῆς πολιάς. To what other class of objects in all creation, except the clouds, can such a phrase be applicable? For no matter what its situation may be, its height, colour, form, or extent,—no matter whether it be the silvery cirrus, a purple mountain, bank of fog, or a nimbus black as night, the cloud was *gray at first*, gray from its birth. The word itself signifies (γραῖος) "old, aged, gray," and the epithet, ἐκ γενετῆς πολιάς, but intensifies the idea. Hesiod writes of them thus:

Φόρκυϊ δ' αὖ Κητὼ Γραίᾳς τέκε καλλιπαρῆους
ἐκ γενετῆς πολιάς, τὰς δὴ Γραίᾳς καλέουσιν
ἀθάνατοί τε θεοὶ χαμαὶ ἐρχόμενοι τ' ἄνθρωποι,
Πεφρηδὼ τ' εὐπεπλον Ἐνυὼ τε κροκόπεπλον.—Theog. 270.

For Phorcys Ceto retrogressive bore
The fair-cheeked Graiæ, hoary from their birth,
Pephredo well tricked out in fair attire,
Enyo too, in saffron mantle clad;
And these both gods immortal and the men
That come to earth's domain, the Graiæ call.

NOTES.

- 1 αῦ.—The description of the terrestrial orb commences with the clouds lying over the exterior, and proceeds *downwards* to the centre of the earth; thus, the Graiæ, the Gorgons, Ophis.

καλλιπαρήους.—The colouring of the clouds is often exceedingly beautiful, varying from creamy white to blushing red.

“ Ye clouds that are the ornament of heaven,
Who give to it its gayest shadowings
And its most awful glories; ye who roll
In the dark tempest, or at dewy evening
Bow low in tenderest beauty;—ye are to us
A volume full of wisdom.”—*Percival*.

- 4 Πεφρηδῶ.—The word, allowing for the interchange of λ and ρ, is equivalent to Πεφληδῶ, and thus has the very same signification of (φλιδᾶω) “overflowing, heaping,” that we find in our own *cumulus*. The idea is strengthened by the use of εὔπεπλον.

Ἐνυῶ.—Doric for ἐλυῶ, and hence (λύω) “that which looses or scatters,” like our word *stratus*. The same word, λύω, signifies “to kill, to slay,” and is hence applied to Enyo, the goddess of war.

κροκόπεπλον.—The stratus is “the cloud of evening,” and an evening sky of a greenish or yellowish tinge indicates rain.

Hesiod, it is seen, classifies clouds as Cumuli and Strati. Apollodorus mentions the same two Graiæ, and adds a third whom he calls Dino (Δεινῶ), that is, (δινῶ) “the whirler,”—evidently a personification of our *cirrus*, or “curler.”

It is further observable that the original myth contains no mention of the one eye and one tooth possessed in common by the Graiæ, and which they borrowed from one another when required. Such is either an addition to or an amplification of—and it is difficult to judge which—the knowledge extant in Hesiod’s time. Grotesque as it sounds, it is perfectly in accordance with the truth.

Evaporation is constantly occurring and from all surfaces, even the most parched. The elastic force of the aqueous vapour thus generated is dependent on the temperature, and expressed by the number of inches the mercury will be depressed in the barometric column. The same figures represent the saturating point of air, or the amount

of vapour which air is capable of absorbing at a certain degree of temperature. Thus, at 65°, 70°, and 80° F., the respective elasticities and saturating points are .617, .727, and 1.001 inches of barometric pressure. At 70°, for instance, water could give forth vapour enough to depress the mercury .727 of an inch. If the barometric pressure showed but .627, there would consequently be room for .1 inch more, and the air is said to be dry or thirsty to the extent of (.1) one-tenth of an inch of the barometer, that is, to the full elastic force of air at 70°. If the full amount, .727, be arrived at, no more vapour can be absorbed at a heat of 70°, and the air is said to be saturated, or the elastic force to have arrived at its maximum. Any further change above or below 70° will cause different results. If raised, say to 80°, evaporation will resume its action and can continue till the air has absorbed as much additional vapour as can counterbalance 1.001 inches of mercury: and so on, additional vapour being produced and supported by every additional degree of heat. If, however, the temperature at 70°, instead of being raised, were lowered, say to 65°, then the excess of vapour represented by the difference between the respective saturating points, .727 and .617, would be thrown out as visible vapour in the form of cloud.

In general, then, it may be said that aqueous vapour up to the point of saturation remains invisible, and that progress on its part towards cloud-making entails the action of Condensation and a lowering of the temperature. The former reduces the mass to a smaller bulk; the latter renders a portion of it visible: the former by itself might only produce dew; the two combined produce cloud.

Let but a wisp of gray appear in a sky that has previously been intensely blue, and we know that one of the Graiæ is gazing down upon us. What has caused that wisp of gray? What has given vision to the cloud? What has given its eye to this one of the Graiæ? All three questions are identical, and the answer to each and all is, "A lowering of the temperature," or, in brief language, Cold. Let the temperature but rise and that eye of gray will vanish;

let it fall, and that eye appears once more. Cold, then, is the one and only eye belonging to the clouds.

Again, with the appearance of our friend in gray there was liberated not alone the latent visibility but also that latent heat which true aqueous vapour always has, and which it parts with only when changed to the liquid form, or condensed. Condensation triturates the vapoury mass, reduces its volume, liberates the heat, and prepares it for subsequent liquefaction and excretion. It is thus to aqueous vapour for all intents and purposes what mastication is to food, and may consequently be well compared to what the myth has styled it, the one and only tooth belonging to the clouds.

But neither tooth nor eye is a permanent possession, for we have seen how our cloudlet vanished for a while. What became of Condensation and Cold in the interval? "Although evaporation is going on abundantly in the lower regions, and the temperature such as to sustain it in the invisible form at the earth's surface, yet when it rises upwards, it will come to some stratum too cold for it, and where, therefore, a certain portion must be thrown out of the invisible into the visible state, and cause a cloudy layer to be formed. Above this the air will perhaps be clear for a considerable way, but at a certain additional height the same excessive coldness will occur, causing a succession of cloudy layers." Some other portion of the atmosphere, then, suitably saturated and affected by its own measure of cold, seized for its own the condensation and cold that had vanished from the cloudlet with the accession of heat,—seized upon them, and looked down on earth from a different quarter of the sky. The saturated and as yet invisible 69° borrowed the tooth and eye from 70° , 68° from 69° , 67° from 68° , and so on interminably; so that, as the myth tells us, the tooth and eye are ever changing places, and will continue to do so as long as aqueous vapour and difference in temperature subsist.

CHAPTER X.

THE LIGHT THAT FAILED.

SECT. 1.—THE GOLDEN AGE.

Gorgons.—The Theogony of Pontus and Gæa has thus far brought us retrogressively ($\alpha\upsilon\tau\iota\varsigma\ \delta'\alpha\upsilon$) from Nereus to Thaumas, and from Thaumas to Phoreys and Ceto, that is, from the confines of our Earth's gaseous envelope, when extended furthest and prior to contraction, down to the exterior and interior of our globe. Of Phoreys and Ceto, we are told, were sprung in the same retrogressive ($\delta'\alpha$) manner, the Graiæ, the Gorgons, and Ophis. The Graiæ have been identified as the clouds that surround the surface from which they had their being. What, then, still proceeding retrogressively, can be left for the others to represent? Evidently nothing but the globe proper.

We have seen it as it was under Pontus and Gæa, a homogeneous, all-incandescent, circular mass, loosely defined and of vast extent. With the first contraction and differentiation that ensued, there would be a Nereus or rain-making region left on the outside, a Phoreys and Ceto or evolving nucleus inside, and an electric-producing Thaumas occupying the space between the two. But the nucleus was ever shrinking in size and ever changing from the nebulous to the fluid igneous state. In proportion as it grew smaller and parted with all that was vaporisable on its surface, so did the differentiating space grow larger and filled with the elementary matter thus thrown off in a gaseous condition. Contraction, radiation of heat, and the throwing off of vaporisable matter would end only when a crust was established on the glowing surface. How long the period was between the initial and final stages is not

known. The time measurements occupied by our earth in Cainozoic, Mesozoic, Palæozoic,—nay, even in cooling from the fused state to incrustation, have been calculated, with different results it is true, by different writers. Still they have been attempted. But, says Helmholtz, “with regard to the time during which the first nebulous mass condensed into our planetary system, our most daring conjectures must cease.”

During this interval, however long it may have been, what forces would be at work within and upon the gradually shrinking orb? “Let us follow rather further,” says Bonney, “the history of one of these planetary masses detached from the central sun. It is composed of somewhat similar material, and even at the moment of severance probably is still in a more or less nebulous condition and at a very high temperature. As it proceeds on its journey heat is lost by radiation into space; the temperature of the whole mass falls, but the outer layers are especially chilled. For a considerable while there will be an up and down movement in the orb, the cooler matter descending from the exterior, the hotter ascending from the interior. By this means, in process of time, a kind of stratification will be produced in the mass, the lighter and more readily vaporised substances working their way towards the exterior, the heavier and those which most readily solidify accumulating at the interior. This transference and selective ordering will continue as long as the materials of the planet remain in a vaporous or even in a thoroughly liquid condition. As time goes on, internal movements and relative displacements will become more difficult. The outer surface of the globe will begin to crust over, and the condition of the interior (whether simultaneously or not we cannot say) will be modified by another cause. Here obviously the condensation of the mass produces a tremendous pressure. The high temperature of the interior tends to drive its molecules apart from one another, but the weight of the outer layer tends to pack them closer and closer, and thus to produce a solid nucleus. The two tendencies are anta-

gonistic, and our knowledge does not yet enable us to determine which of the two will prevail."

A summary statement of the above-mentioned conditions would be as follows :

1. Downward movements from the exterior, thus causing a packing closer and closer of the particles, and hence contraction of the mass.
2. Upward movements from the interior, with a consequent spreading and diffused lateral arrangement.
3. The radiation of light and heat from the glowing nucleus itself, and particularly from the surface.

Those three agencies are respectively called in the mythological annals, Stheno, Euryale, and Medusa. The derivations are sufficiently suggestive. *Σθενώ* or *Σθεινώ* from *στένω* or *στείνω*, "to contract, to straiten by cramming full"; *Εὐρύαλη*, from *εὐρύς* ἄλη, "wide-wandering, diffused"; *Μέδουσα*, from *μεσώ μέσουσα* (*δ* and *σ* being interchanged, as in *ὀδμή* for *ὀσμή*), "she that occupies the middle, the nucleus." The glowing orb, and particularly its surface, was not only in the middle of its enveloping gaseous layers; it was also in a middle or transition state of being, and a prize placed in the midst of two great contestants, fire and water. All three were collectively called Gorgons, *Γοργόνες* (*γῆ ἔργα*) "the works or agencies of earth." Two, Stheno and Euryale, are immortal according to Mythology. We must admit it, if we believe with science that earth is growing colder, denser, and more contracted. We must admit it even from the evidence of our senses. The up and down and lateral movements are with us still: every volcanic outburst shows that the central fires are rising and that Euryale is still alive; every earthquake suggests that the subterranean rocks have snapped and fallen in, and that Stheno is immortal. Not till the lava ceases to flow from the molten interior, and the crust to vibrate and tremble from the subterranean wave, not till then will those two Gorgon sisters die.

But while such inner movements are constant factors in the world's being, how would it be with the surface and the

incandescent glow extending from it? It would not share in the immortality of the central forces; it would be vulnerable to cold and pressure; it, Medusa, would be the mortal one of the three and doomed to suffer. And yet it is owing to this mortality that she stands out so pre-eminently, and the most distinguished character of the age she lived in. That age, as already pointed out, embraced much of the vaporous incandescent and all the fluid igneous down to the formation of a crust that barred in the central heat and ended for ever the self-luminous days of earth. Its natural sub-divisions, so far as regards the surface, would consequently be Incandescence, Sub-incandescence, and Non-incandescence.

In the same way are we invited by the myths to consider Medusa under three consecutive aspects; first, as a beautiful maiden with golden locks; secondly, as one with convulsed features and snaky tresses; thirdly, as having been decapitated. The consecutive aspects of Medusa and the consecutive stages of the orb's exterior are but the mythological and scientific rendering of the same conditions.

If we wish to form a conception of what our earth looked like in the first or incandescent stage, we have but to remember that it was then self-luminous, and a sun like unto our own of to-day. It, our sun, consists in brief of a solid or liquid incandescent nucleus surrounded by an atmosphere of glowing vapour. This atmosphere embraces several distinct gaseous layers or envelopes of great depth, all of which consist of some form or other of elementary matter in a vaporous condition, and most of which are luminous. Such, then, was earth and such did it appear in palmy days long past. While the heat and light continued so abundant and intense, it would have no need or use of metal, metalloid, or compound body; with such a degree of light and heat no rain would fall, no cloud condense, and life with all its cares and troubles would not be. And so it would tranquilly wend its destined path in space, *a glowing nucleus encircled by ringlet upon ringlet of luminous vapour*, most glorious and conspicuous to be seen.

Is not this Medusa? The beautiful *Μέδουσα* or *nucleus*, who was famed in song and story for the golden ringlets she possessed in early youth?

What does Ovid say?

Clarissima forma
Multorumque fuit spes invidiosa procorum,
Illa; nec in tota conspectior ulla capillis
Pars fuit. Inveni, qui se vidisse referret.

Met. IV. 794.

Though beautiful us a whole, says the poet, still the charm that rendered her most conspicuous was the luminous rays or golden harvest of her head.

Her destroyer, the cold-blooded son of Danaë, never saw her in this stage. The wondrous curious robe of Nature's giving had been transformed sadly when Perseus set out upon his vengeful mission. Even Zeus himself, the sire of Perseus, was later born than Medusa, since there was certainly no life while incandescence was at its acme. Virgil alludes to this period and to its prevalent conditions:

Ante Jovem nulli subigebant arva coloni:
Nec signare quidem, aut partiri limite campum
Fas erat; in medium quærebant: ipsaque tellus
Omnia liberius, nullo poscente, ferebat.—Georg. I. 125.

Ere dawn of life no hills pressed down the plains:
To even shape or mark its range with bounds
Was granted not: all things the centre sought:
And earth itself, with none to say it nay,
Continued sending forth too freely all.

NOTES.

- 1 coloni.—The Greek *κολωνός*, "a hill," is Latinised by the poet.
- 3 nec fas.—The incandescent orb was undefined and vast.
in med. quærebant.—Gravitation was at work.
- 4 Omnia liberius.—As light and heat.

We must expect that an age so important and so fascinating as this would have a distinctive name assigned it in Mythology. It has. Under the title of "The Golden Age" it has been alluded to by many of the prose writers and has been written of in some form or other by most of the classic poets. Here is Ovid's description:

- Aurea prima sata est ætas, quæ vindice nullo
 Sponte sua, sine lege fidem rectumque colebat.
 Poena metusque aberant, nec verba minacia fixo
 Ære legebantur, nec supplex turba timebat
- 5 Judicis ora sui, sed erant sine iudice tuti.
 Nondum cæsa suis, peregrinum ut viseret orbem,
 Montibus in liquidas pinus descenderat undas ;
 Nullaque mortales præter sua litora nôrant.
 Nondum præcípites cingebant oppida fossæ :
- 10 Non tuba directi, non æris cornua flexi,
 Non galeæ, non ensis erant. Sine militis usu
 Mollia securæ peragebant otia gentes.
 Ipsa quoque immunis rastroke intacta, nec ullis
 Saucia vomeribus per se dabat omnia tellus :
- 15 Contentique cibus nullo cogente creatis,
 Arbuteos fetus montanaque fraga legebant,
 Cornaque et in duris hærentia mora rubetis,
 Et quæ deciderant patula Jovis arbore glandes.
 Ver erat æternum, placidique tepentibus auris
- 20 Mulcebant zephyri natos sine semine flores.
 Mox etiam fruges tellus inarata ferebat,
 Nec renovatus ager gravidis canebat aristis :
 Flumina jam lactis, jam flumina nectaris ibant,
 Flavaque de viridi stillabant ilice mella.—Met. I. 89-112.

All glorious was the first of ages sprung,
 That freely, wildly, none to say it nay,
 Its trust and course unswerving did pursue.
 Far off abided dreadful Doom and Care,
 (Nor threat'ning words were read in air on high,
 Nor feared its judge's looks a prostrate world.)
 But harmless both were those without the judge.
 As yet no clay, from its own mountains lashed,
 That it might visit an outlandish sphere,
 Had downward sunk into the liquid waves :
 And save those banks aught mortal none had known.
 As yet no fossils deep the ramparts girt,
 No tube of straight, no whorls of twisted mail,
 No helms, no swords there were ; their seed exempt
 From strife and care spent happy days of ease.
 Earth's self too, unconfined, untouched by brake,
 Gashed by no ploughs, gave naturally all.
 And nought compelling them, the close-packed seeds
 In the created fare were gathering
 The acrid vapours, alpine tuffs and grits,
 The berries clinging in the swelling red,
 And kernels fallen from life's opening tree.

'Twas constant spring ; and zephyrs softly licked
 With tepid blasts the seedless floss produced.
 Yet in the time to come that virgin earth
 Bore fruit of every nature, and the land
 That knew no tilth was hoar with teeming corn.
 But now the milky, now the nectar floods
 Kept rolling on, and from the humid vault
 The yellowed honey drops distilled alway.

NOTES.

- 1 vindice nullo.—So Genesis ii. 5. “ And every plant of the field before it was in the earth, and every herb of the field before it grew : for the Lord God had not caused it to rain upon the earth, and there was not a man to till the ground.”
- 3 poena, metus.—The equivalents of Virgil’s “ mortiferum bellum ” and “ labos,” and both the Latin forms of the Greek μόρος and κῆρ, the first-born of Nox.
- verba minacia.—There were *no clouds*, portentous of storms : all was incandescent vapor.

“ Storms when I was young,
 Would still pass o’er like nature’s fitful fevers,
 And rendered all more wholesome. Now their rage,
 Sent thus unseasonably and profitless,
 Speaks like *the threats of heaven*.”—*Maturin*.
- 4 turba.—Our “ world ” and the Latin *turba* have the same meaning, that which is *whirled round*.
- 5 tuti.—Supply “ poena metusque ” from line 3.
- 7 pinus.—The Greek πίμος, “ dirt, clay.” There were no mountains, nothing to suffer denudation. Hence there was no clay to be carried to the bed of ocean (peregrinum orbem), and organic beings have no other habitats except the land and sea (præter sua litora).
- 9 fossæ.—There was no life ; therefore, no fossils. Ovid mentions in anticipation some of the fossils of Palæozoic times, such as the Orthoceratites (cephalopods with *straight* shells), Lituities (cephalopods with *spiral* shells), and the Ganoids or mailed and sworded fishes.
- 10 æris.—So Gay :

“ We strip the lobster of his scarlet mail.”
- 12 securæ—se curæ “ apart from, or exempt from care.”
- 13 immunis.—It had as yet no walls, no covering or crust ; and there were no denuding (*rastris*), nor upheaving (*vomeribus*) agencies : all was comparatively calm (ver erat æternum).
- 14 per se dabat.—Earth was freely parting with its light and heat.
- 15 Contenti.—Supply “ gentes ” from line 12. The seeds of matter, organic and inorganic, were packed closer together (contenti—contineor) by the downward movements from the exterior.

- 16 Ovid has already made use of the terms *arbutos fœtus*, *fraga*, and *corna* in his fable of "Polyphemus and Galatea," and in the sense mentioned here.
- 17 *mora*—*durus* means "swelling," just as *duritiæ* denotes "tumors, swellings," and is used in connection with *mora* "mulberries," to characterize the *berry-like* or *blistered* appearance of lava when *rising* or *swelling* in the crater. "At the constantly, but quietly active volcano of Stromboli, the column of lava in the pipe may be watched slowly rising and falling with a slow rythmical movement. At every rise the surface of the lava swells up into blisters several feet in diameter, which by and by burst with a sharp explosion that makes the walls of the crater vibrate."—Encyc. Brit.
- 20 *sine semine flores*.—The efflorescence or vitreous scum that must have sometime formed on the molten surface.
- 23 *lactis*.—Even in the crater of Kilauea the boiling lava is often observed to be at a *white heat*, indicating a temperature of 2400° F.
- 24 *flava mella*.—The vapour in the upper regions was getting cooler and condensing into the first rain drops.
- ilice*.—Ovid Latinizes the Greek *ἑλῖξ* or *ἑλῖξ*, "anything twisted or spiral; a vault or arch"—and hence applied to the twisted roots and spreading branches of the ilex or holm tree.

SECT. 2.—A DYING-OUT SUN.

We must suppose thousands upon thousands of years to have rolled on ere next we gaze upon the Gorgon children of Phorcys and Ceto. It is now the sub-incandescent period, and its æons also are drawing to a close. We look for the two immortals and still behold them occupied, though not quite so actively as of yore, with their works of transference and selection. Medusa too appears; but ah! how changed! Beauty, a troublous beauty is hers still, symmetry too, and the poetry of motion; but twin snakes have coiled their folds around her head, and her crowning charm, those golden tresses that had made her once so conspicuously enchanting, are now transformed to a withering, hissing mass of serpents! What has brought about those horrors? When Ovid wrote the concluding line of his Golden Age—

Flavaque de viridi stillabant ilice mella—

he pointed out the source and means.

Let us go back a little as to time.

While our orb was still incandescent and haughtily dismissing from its domains one element after another, some of those that had been first rejected were plotting for a return to their native shores. Chilled in the distant climes to which they had been exiled, and ardently longing for more genial lands, the hydrogen and oxygen united their forces in the proportion of two to one, and for the first time in the history of matter was that combination formed which we call *water*. With the first drop that distilled above was the tocsin of rebellion sounded, boding irreparable mischief to the splendour and tranquillity of golden incandescence. Science has told us how the primal rain came down. Inch by inch it fought its way from the glacial regions of space. Beaten back as steam, it condensed its columns, reformed its ranks, and hurled itself again with redoubled vigour on the very layer of fiery vapour that had lately succeeded in repulsing it: that overcome, it attacked the next, and the next; and so on, till it forced its way through every gaseous layer and every atmosphere that surrounded the nucleus of our globe. Here, too, was no cessation from the struggle between fire and water. The intruding drops, whether one by one, or massed in serried lines, were instantly rejected from the glowing surface and forced, seething, sputtering, and hissing, to retreat in volumes of dark vapour. Again did they advance, again retreat, till, in the words of Winchell, "the field between the cloud and earth was one stupendous scene of ebullition."

The results must have been terrific. The descending rain, when beaten back as super-heated steam, would be in a condition to part readily with its elemental constituents; and the oxygen and hydrogen uniting with the carbon, sulphur, phosphorus, nitrogen, sodium, potassium, and other elements that pervaded the gaseous layers, would cause a series of chemical combinations with the consequent explosions and deflagrations, such as it is impossible to picture. In our thunderstorms of to-day the gaseous nitrogen and oxygen are supposed to be combined by light-

ning and to produce the deadly nitric acid. No combination that we know of would be impossible in those early days of earth when the descent of rain and ascent of heated vapour made an endless band with constant friction ; when such enormous volumes of steam generated electricity, and produced flash after flash of lightning to decompose, combine, and decompose again ; and when every element that we know of was contained in the atmosphere and thirsting for affinities. Imagination cannot paint too highly the horrors of this primeval day, nor the change produced in the once incandescent region that enveloped earth. The vast volumes of black, gray, and spotted vapour, that resulted from steam and chemical reactions, curled, writhed, and twisted into spiral folds ; they blotted out the heaven and shot forth every now and then tongues of fire and flame ; they dropped a thousand acrid, poisonous gases from their pores ; all these and more, while thunders pealed, and while ever there was heard the hissing and the seething of the rain drops scorched to evaporation by the dreadful heat.

What better comparison—what *other* comparison can there be for this most astounding change in incandescence than that which is given to us in the Myths ? Can anything be more brief, more comprehensive, more vividly descriptive of the scene than to say that Medusa's golden locks were transformed to a mass of hideous, hissing, and envenomed snakes ? And why ? For the reason, the self-same reason which Science mentions, namely, that Neptune, the powerful god of water, made advances to Medusa, incandescent earth, and would not be denied. It may be said that it was Nereus, the primal rain, who came down. But it was not water in this form that caused such changes : it was *steam*, and Neptune represents water in all its forms.

Ovid describes the past glories and present horrors of Medusean incandescence. Requested by one of the chieftains at the banquet-board of Cepheus, Perseus has told of that portion only of the Gorgon's history in which he

himself so prominently figured. The poet continues thus :—

- Ante expectatum tacuit tamen. Excipit unus
 Ex numero procerum, quærens, cur sola sororum
 Gesserit alternis immixtos crinibus angues.
 Hospes ait, "Quoniam scitaris digna relatu,
 5 Accipe quæsitæ causam. Clarissima forma
 Multorumque fuit spes invidiosa procerum
 Illa: Nec in tota conspectior ulla capillis
 Pars fuit. Inveni, qui se vidisse referret.
 Hanc pelagi rector templo vitiasse Minervæ
 10 Dicitur. Aversa est et castos ægide vultus
 Nata Jovis textit: neve hoc impune fuisset,
 Gorgoneum crinem turpes mutavit in hydros."

Met. IV. 790—801.

Yet nought he spoke of what had happened before.
 One of the nobles' train takes up the theme,
 Asking why she alone of all the three
 Bore snakes commingled with alternate locks.
 The guest replies, "Since things you wish to know
 Well worthy of being told, the reason hear.
 Most luminous in aspect once she was,
 And tantalizing hope of many flames:
 Yet all in all no other part was there
 More obvious than her ringlets to the view.
 I've met with one who said he saw herself.
 The ruler of the blue is rumoured wide
 To have defiled her for Minerva's shrine.
 Backward she shrunk, and o'er her features chaste
 The maid of Jove the mantling ægis drew:
 Nor yet was this without its load of care,
 To grimy snakes it changed the Gorgon hair.

NOTES.

- 8 se vidisse.—Commutations in the luminous layers would cause openings whereby, as in the case of our own sun, those dark spots would be seen which we suppose to be portions of the orb's surface.
- 9 templo Minervæ.—Minerva is the goddess of organised force, or organic force. Every change that occurred to earth tended towards fitting it as a habitation for organised beings.
- 10 aversa est.—Cooled by the onset of the rain, the earth *contracted* in its volume. As a general rule, all bodies passing from a liquid to a solid state are diminished in size; by one-tenth, it is said, in the case of molten metals.
- ægide textit.—The cooling caused by vapour and rain would induce the elements to combine, to organise as it were.

- 11 neve impune.—But this same cooling and elementary combination would cause also such dense fumes as would throw a pall of darkness around the globe.
- 12 mutavit—supply *hoc* from the preceding line. The use of “hydros” is very significant, as it means “water-snakes,” that is, the grimy volumes of steam.

SECT. 3.—THE “CLOSING” SCENE.

We come to the last stage of Earth's eventful incandescent history. Neptune had done his work and done it well. One by one he spoiled the luminous layers that graced its head; one by one did he convulse every feature of that head itself. With all his bland and soft and sinuous ways, he, this water god, was a cruel wooer and tortured his victim to the very last. And if, perchance, he did show some pity once in a while, the blue-eyed virago sprung from the head of Jove, was ever at his side, whispering the magic word “organisation,” telling him that the end justified the means, and spurring him with the hope that in the time to come he would be the sole ruler of three-fourths of earth's domain, and a mighty potentate over what was left. And so he continued harrying and lashing the still beautiful but doomed earth below, removing the whiteness from its brow, the blush from its cheeks, the carmine from its lips; searing its very eyeballs till at last the light went out and the enforced darkness was a blessing, till the tears, “tears of vengeance, drops of liquid fire,” that gushed apace were changed to viscous rheum which stained the once fair surface with scum and pus and filmy scoriaceous matter, the recrements of oxidation on the molten surface. Alas for incandescence! The end has come, or nearly come, and “all the world's glory is but dross unclean.”

The description is not a fanciful one, nor overdrawn. It is the natural prologue to a more stable incrustation, and the only result that could accrue from cooling and the downpour of the rain.

The following quotations are interesting as serving to point out the general idea entertained of Earth's aspects at

this stage of its existence. "In obedience to the law of thermal equilibrium—a law which undoubtedly rose into being with the birth of matter—the high temperature of the earth gradually subsided through radiation into external space. A crystallisation of the least fusible elements and simple compounds eventually took place in the superficial portions of the molten mass. This process continued till a crystalline crust had been formed, resting upon the liquid mass which still constituted the chief bulk of the globe. . . . We may conclude, then, that a solid film began to form over the surface of the molten sea. But the earth was even then, as from the beginning, obedient to the law of axial rotation; and the sun and moon reached forth with their attractive influences to solicit the mobile rocks into tidal elevations. As the wave pursued the moon around the earth, it daily ruptured the forming film, and only a wilderness of floating fragments remained, strewn over the surface of the fiery abyss."—*Winchell*.

Bonney, writing on the same topic, says that the Earth would contract in cooling; that the strain produced by this change in volume, aided as it would be by the pressure of imprisoned vapours and by the tidal waves of the molten sea beneath, would again and again rend and shatter the primal filmy covering into innumerable fragments; and that "as the crust would be heavier than the fluid on which it had formed, those fragments might be engulfed and perhaps again melted down; or, as the fluid would be already in a viscous condition and the difference in specific gravity would not be great, the fragments would very probably continue to float."

Figuiier writes in the same strain: "Those glacial regions which would be traversed in its course by the glowing incandescent globe, would necessarily cool it step by step; at first, superficially, when it would take a pasty consistency. Nor must it be forgotten that the earth in its liquid state would be obedient in all its mass to the action of flux and reflux which proceeds from the attraction of the sun and moon, but to which the sea alone is now subject. This

action, to which all liquid and movable molecules are subject, would singularly accelerate the preludes to solidification in the terrestrial mass : it would thus gradually assume that sort of consistence which iron attains when it is first withdrawn from the furnace for puddling. In its cooling process beds or strata of a concrete substance would be produced, which, floating at first in isolated masses on the surface of the semifluid matter, would float together, consolidate, and form continuous banks such as we now see icebergs form on the shores of the Polar Seas ; and finally, when washed by the agitation of the waves, the masses would coalesce and form banks more or less movable."

Now, exactly the same conditions are presented to us in the myths when we view the Gorgons under their most dreadful aspects. Floating on and above the nucleus of the globe there would be a wilderness of fine metallic particles, some of them washed down from the lower layers of the atmosphere whither they had been raised ages before in the gaseous state, more of them driven up from the elemental crust by the still radiating heat and by the bursting fires below : such would be the scales of dragons that surrounded the Gorgons' heads. Again, the eruptive agencies and corroding gases that unceasingly bit into and ripped open each newly forming crust with gaping wounds, huge chasms, and crevasses, are mythologically rendered as enormous teeth ; the fragments of metallic or other nature into which the crust was shattered and which would partly float and partly sink in the molten mass, would be the brazen hands—stretching out, as it were, to grasp their fellow fragments with a warmth that tended to combine and cement the bonds of union ; and the wild bursts of vivid flame and fire, that shot up continuously and traversed earth's whole surface, were the golden wings with which the Gorgons flew. As for their petrifying qualities, there is nothing more absolutely certain. The Gorgons *were* the stone-makers of the world ; by them the molten surface was changed to a covering that, however filmy, was still *rock* ; by them was that film shattered, re-cemented, and

strengthened; by them was the process repeated again and again till finally the entire superficies of earth's expanse—all that had been daring enough to Ken or have knowledge of the Gorgon sisters—was transformed to solid stone, was petrified.

The elementary and fragmentary nature of the primal covering is well pointed out by Hesiod in his description of the Shield of Hercules :

ἐν δὲ λιμὴν εὖορμος ἀμαιμακέτοιο θαλάσσης
κυκλοτερὴς ἐτέτυκτο πανέφθου κασσιτέριοι,
κλυζομένῳ ἱκελος· πολλοί γε μὲν ἄμ μέσον αὐτοῦ
δελφίνες τῇ καὶ τῇ ἐθύνεον ἰχθυάοντες,
νηχομένοις ἱκελοι· δοιοὶ δ' ἀναφυσιώοντες
ἀργύρεοι δελφίνες ἐφοίτων ἔλλοπας ἰχθύς.
τῶν δ' ὕπο χάλκαιοι τρέον ἰχθύες· αὐτὰρ ἐπ' ἀκταῖς
ἦστο ἀνὴρ Ἀλκιεύς δεδοκημένος· εἶχε δὲ χερσὶν
ἰχθύσιν ἀμφίβληστρον, ἀπορρίψοντι εἰκώς.—207.

And in it, out of all-fused metal ore,
Was fashioned, rounded as to shape and like
To what's washed over by the waves, a port,
The refuge safe of the resistless sea.
And in its midst indeed roamed wildly round,
Like gliding fish, a wilderness of white
Metallic fragments; like to swimming ones,
Bobbing in it as in to-day's, they rushed;
And both were blowing. Underneath them shook
Fishes of metal red. But on the heights
Sat Man, the fisher, waiting for his time;
And in his hands, as if about to cast,
A net for all the fishes did he grasp.

NOTES.

- 1 λιμὴν.—The bed of ocean.
- 4 τῇ καὶ τῇ.—In *that* molten sea of fire the fragmentary materials of the crust roamed and bobbed up and down, just as dolphins do when disporting in *this* of to-day's.
- 5 ἀναφυσιώοντες.—Those fragments spurted forth gases, as our whales and dolphins spurt water.
- 6 ἀργύρεοι.—The fragments at a *white* heat would float on the surface; those at a *red* heat (χάλκαιοι), being cooler and denser, would sink more or less below.
- 7 ἐπ' ἀκταῖς.—Winchell, writing of the Primary Period, makes use of the same figurative language: "The generations of men yet slumbered in the chambers of futurity. The order of

Providence had assigned them their position in the grand procession of life which was now beginning to move, and the scouts of which had passed by in the preceding age; but we must wait for Man till a long line of grotesque and marvellous forms has marched before our view."

This entire period of Earth's existence was an eventful one and graced by the presence of many an important personage. In those days flourished Ixion, whose very name identifies him with the (ἰξός) viscous or pasty condition of the surface, and whose foolish love for a phantom crust condemned him to the interior of that circling orb over whose exterior he once held sway. Now began the memorable contest between the Centaurs and the Lapithæ that lasted in a general way till the central forces of our Earth, overcome by the external lapidifying ones, were forced to leave the plains and take refuge in the mountain heights. Now lived Acrisius and his daughter Danae; now, too, was born Perseus who made history for himself by decapitating Medusa,—by ending thus for ever the incandescent days of Earth.

Those two expressions are evidently identical, and as the latter could only be thoroughly accomplished by the formation of a solid crust all round the globe, the decapitation of the Gorgon must imply the same. Her trunk pointed down towards the centre; her head was on a level with the surface: it was that head, that now half-molten surface, which Perseus was commissioned to cut off. How the deed was accomplished we proceed to explain as best we may.

The quotations lately given have left the surface of the globe in the condition of an archipelago of fragments floating, at various depths it may be, upon the still molten mass beneath. "In due time," writes Winchell,—“let us be liberal in our concessions of time—the rocking and jostling fragments became permanently frozen together, as the broken ice of Arctic Seas, after being worried by winds and currents, seizes an interval of calm to consolidate into a vast and rugged floe. So the rock-floe

of this fiery ocean formed at length a bridge of rough and sturdy strength."

"The masses would coalesce," says Figuier, "and form banks more or less movable. By extending this phenomenon to the whole surface of the globe, the total solidification of its surface would be produced. A solid but still thin and fragile crust would thus surround the whole earth, enclosing entirely its liquid interior."

The inference drawn from these passages is that a freezing process, or cold, was a prime factor in the total solidification. Another, atmospheric pressure, is alluded to by Bonney. Assuming, he argues, that the molten surface would be at the same temperature, not less than 2,000° F., which lava has when first emitted, it would then be at a white heat and no water could rest upon it. "The drops of boiling rain," he goes on to say, "would be rejected hissing from the uncongenial surface. But what would this mean? If the present ocean were converted into vapour, the weight of the atmosphere would be augmented by that of a shell of water of the area of the globe and two miles in thickness—or in other words, the atmospheric pressure would be then about three hundred and fifty times its present amount. If so, even a lava flow would consolidate under a pressure equivalent to that of some 4,000 ft. of average rock; it would be like an intrusive sill for nearly three-fourths of a mile below the surface; but the cooling would be slower because the temperature of the atmosphere would be far higher than that of the earth is now, and for long has been, at this depth."

When now we turn to the mythological account we find that these two agencies, cold and pressure, are embodied in the one term, Perseus. The word seems to be connected with *πέρω*, "to waste, destroy, carry off as plunder," and through it with *πρήθω*, "to blow, to swell," and *πρηστήρ*, "a violent wind." The radical of all these is *φέρω*, "to bear" as a load, and with the collateral notion of motion "to carry off;" also, "to rush, to be borne violently along,"

as seen in the cognate *φορεω*. As π and ϕ are interchangeable, *Περσεύς* is derivable from this *φέρω*, and would thus be connected with "bearing" and "motion" in any direction, that is, with "*pressure and wind*." A simpler derivation, *περί σέύω*, "rushing all round," will give the same idea of a *cold wind or wave*. It is certainly under this aspect of a cold wind or wave that we find Perseus alluded to by the poets as a rule. The epithets, *celer*, *ferox*, *penniger*, *præpes*, *alatus*, &c. applied to him are distinctive enough in their way.

αὐτός δὲ σπεύδοντι καὶ ἐρρίγοντι ἑοικώς
Περσεύς Δαναΐδης ἐπταίμερο.—Shield. 228.

Gorgonis anguicomæ Perseus superator, et alis
Ætherias ausus jactatis ire per auras.—Ov. Met. IV. 699.

The same inference can be drawn from every other Greek and Latin quotation bearing upon Perseus, and is strikingly confirmed by what Horace writes in his Satires, I. 7. A cursory examination of this particular satire tends to show that all the characters and names of places mentioned are fictitious, and that there is no proof whatever of Rex Rupilius, Persius, the Sisennæ and the Barri having been living personages. If, however, we consider the names as Greek words "slightly twisted" so as to suit the Latin (a privilege the poet is so particular in claiming in his *Ars Poetica*), we shall find that the motive, or one of the motives, of the piece is the formation of a crust upon our globe.

- Proscripti Regis Rupili pus atque venenum
Hybrida quo pacto sit Persius ultus, opinor
Omnibus et lippis notum et tonsoribus esse.
Persius hic permagna negotia dives habebat
- 5 Clazomenis, etiam lites cum Rege molestas ;
Durus homo atque odio qui posset vincere Regem,
Confidens tumidusque, adeo sermonis amari,
Sisennas, Barros ut equis præcurreret albis.
Ad Regem redeo. Postquam nihil inter utrumque
- 10 Convenit :—(hoc etenim sunt omnes jure molesti,
Quo fortes, quibus adversum bellum incidit ; inter
Hectora Priamiden animosum atque inter Achillem
Ira fuit capitalis, ut ultima divideret mors,

- Non aliam ob causam, nisi quod virtus in utroque
 15 Summa fuit; duo si discordia vexet inertes,
 Aut si disparibus bellum incidat, ut Diomedi
 Cum Lycio Glaucō, discedat pigrior, ultro
 Muneribus missis),—Bruto prætore tenente
 Ditem Asiam, Rupili et Persi par pugnāt, uti non
 20 Compositum melius cum Bitho Bacchius. In jus
 Acres procurrunt, magnum spectaculum uterque.
 Persius exponit causam; ridetur ab omni
 Conventu; laudat Brutum laudatque cohortem,
 Solem Asiæ Brutum appellat, stellasque salubres
 25 Appellat comites, excepto Rege; canem illum,
 Invisum agricolis sidus, venisse. Ruebat,
 Flumen ut hybernum, fertur quo rara securis.
 Tum Prænестinus salso multoque fluenti
 Expressa arbusto regerit convicia, durus
 30 Vindemiator et invictus, cui sæpe viator
 Cessisset, magna compellans voce cucullum.
 At Græcus, postquam est Italo perfusus aceto,
 Persius exclamat, “ Per magnos, Brute, Deos te
 Oro, qui reges consueris tollere, cur non
 35 Hunc Regem jugulas? Operum hoc, mihi crede, tuorum est.

To trimmers all and blear-eyed, I should say
 'Tis known how mongrel Perseus had a rod
 In pickle for the pus and virus of
 That outlawed regent, ycleped Purbblind Fire.
 This Perseus, who himself could draw a draft
 Ad lib., had much to do with blusterers,
 And troublous quarrels with the regent too;
 A hardy fellow who in bitterness
 Could beat the regent,—reckless, puffed with airs,
 Of breath so cutting that he could outstrip
 Loud-rumbling earthquakes on his coursers gray.
 Back to the regent go we. After nought
 Between them intervenes,—(since brawlers all
 Are in this same dilemma as the brave
 For whom the tide of battle comes to pass;
 Between the boastful Hector, Priam's son,
 And 'tween Achilles was there wrath, so great
 That death should end at last, for reason none
 Save that in each was bravery supreme;
 But if two laggards discord vexes, or
 If war breaks out between an ill-matched pair,
 As Diomed with Lycian Glaucus, then
 The more faint-hearted of the two must yield,
 With bribes thrown in for grace,)—the ample earth
 Being governed by brute matter as its lord,

The even fight begins of Purblind Fire
 And Perseus, so that better matched was not
 Bithus with Bacchius. To viscous paste
 The edges run, a wondrous sight the two.
 His motive Perseus shows; by all the pack
 He flouted is; brute matter it exalts;
 The crowd too it exalts; a sun it styles
 The earth's brute matter, calls the adjuncts all,
 Outside the regent, healthy ornaments;
 Perseus himself, a hound for having come
 A blast distasteful to the toilers all.

Like a cold wave, wherewith a fine-edged axe
 Is borne, did he rush. Then headlong stretched,
 This bold, undaunted stripper of the vines—
 To whom had yielded off the wayfarer
 With voice stentorian railing at his cowl,—
 Flings right behind him all the filth expressed
 From the salt, molten nursery below.
 But when well-drenched with verjuice strong he is,
 This Perseus volatile cries out aloud,
 "O matter brute, whose wont it will have been
 To make away with kings, those powerful gods,
 Why do you butcher not this king, I pray?
 This is, believe me, worthy of your pains.

NOTES.

- 1 Regis.—"Rex" is the Latin form of the Greek *Μέδουσα*, "a ruler."
 Rupilt.—Rupilius is but the transposed form of *πυριλλος*, that is,
 (*πῦρ ἄλλος*) "fire half blinded," and denotes the half-molten,
 half-filmy nature of the earth's exterior covering.
- 2 hybrida.—Perseus was the offspring of *dissimilars*, namely, of Zeus
 or life, and of Danae (*δᾶ νάω*) "the floating earth," or the
 floating fragmentary surface.
- 3 lippis—tonsoribus.—He alludes to the *scum* forming on the surface,
 and to the manner in which the exterior was *clipped or trimmed*
 by Perseus.
- 5 Clazomenis.—*κλάζω*, "to make a loud noise; to rush" like the
 winds, "to clash or rattle" like fragments.
- 6-8.—These three lines are strikingly illustrative of a cold, bitter,
 violent, and impetuous wind.
- 8 Sisennas, Barros.—"Sisennas" is but a transposition of *ἐννοσις*,
 "shaking, quaking." "Sisennas Barros" is really but one
 word, and the Latinized form of *ἐννοσεῖς βαρείας*,—a phrase used
 by Hesiod in his *Titanomachia*, "*ἐννοσις δ' ἔκανε βαρεία Τάρταρον
 ἡρόεντα*." It is worthy of note also that there is no copulative
 between the two words in the Latin text.

The vibrations of some powerful earthquakes have been

known to traverse half a hemisphere. During the famous Lisbon one in 1755, many of the lakes in central and north-western Europe were affected to the extent of raising waves 2 or 3 feet above their usual level.

- 9 nihil.—When, after having come from the glacial regions of the Poles, there was no intervening space between the action of the cold and the debris on the molten surface.

Horace plunges in medias res, and brings Perseus face to face with the Gorgon.

- 10 hoc jure.—It is only when combatants, whether brave or cowardly, do come face to face, that results follow.

- 18 Bruto.—*brutus*, “senseless, brute matter.” The Greek equivalent βρῦτος, “fermented liquor,” points out the active internal motion of the molten mass that still ruled over the entire globe.

- 19 Asiam.—The Greek αἶα, “earth”; so too, we find ἔπισθεν for ἔπιθεν, Μῶα for Μοῦσα, ὄρμαον for ὄρμασον, &c.

- 21 acres.—The sharpened ends; ἀκρίς, “the extremity.”

- 22 exponit.—If two pieces of ice have their surfaces moist, and if the temperature be 32° F., they will freeze solidly together, when their edges are brought in contact. This process is known as Regelation, and it or some process akin to it, as the welding of metals, has been assigned by modern science, as well as by Horace, as efficacious in uniting and consolidating the fragments of the primal crust.

- 23 laudat.—The word brings to mind the *surging* of the fiery mass.

- 24 Solem Brutum.—There was still intense heat, intense enough for light, in the entire mass, *except the surface* (excepto Rege) which the fragmentary scum had reduced to a purblind condition (Rupil).

- 26 Ruebat.—The preceding word *venisse* ends the criticism of the *conventus*. Perseus now proceeds to complete his work of consolidation.

- 27 flumen ut hibernum.—This idea of “a cold wave” is in striking conformity with the modern theory that our earth has undergone many lengthened periods of heat and cold during its long existence, and that the historic Glacial Period was but the last of many that preceded it. According to Dr. Croll there is a great climatic change for each hemisphere every 10,000 years or so. If we divide this length of time into the millions of years occupied by the earth in its change from incandescence to non-incandescence, there will be quite a respectable quotient. So that our orb, while impervious in a degree to the earliest glacial cycles, owing to its intense heat and light, would feel perceptibly the latest one when the heat and light were on the wane.

- 28 Prænestinus.—A composition of πρηγής τεῖνω “stretched out head-foremost.”

- 29 regerit.—The wind, like a cyclone, carried off all the flame, sparks, and lighter refuse from the surface over which it rushed.
- arbusto.—A common simile with writers is to compare earth at this time to a “furnace”: Horace compares it to a “nursery,” where seeds are planted for future growth.
- 30 cui sæpe viator &c. —This description of how in after ages the wayfaring traveller would often have his hat or cowl torn from his head by the same “stripper” is enough of itself to establish Perseus as a bitter, violent wind.
- 32 Græcus.—“After the fashion of a Greek, fickle, volatile.” Hence the use of “Italo” in opposition to Græcus, to denote “that which is steadfast, strong.” The corrosive gases and deadly combinations in the atmosphere are denoted by *Italo aceto*.
- 33 per magnos.—One word, *permagnos*.

His identity being thus established, we can have no hesitation in believing Perseus as the one potential agent to whom was entrusted the freezing or regelation of the fragments, edge to edge, and the consolidation of the whole as a crust for our globe. This, as already noticed, is the most feasible solution of the problem according to modern theories, and Horace is close in touch with science when he says “in jus acres procurrunt”; and then, after a period of tumultuous rocking, jostling, and surging, “ruebat, flumen ut hibernum, fertur quo rara securis.” Other writers, while not committing themselves so notably as Horace does, to the precise way in which a crust was formed, are equally pronounced in pointing to Perseus as a cold wind or wave that came from the glacial regions after a fashion somewhat similar to that of the great polar current of air towards the equatorial regions of to-day. Ovid describes the event in his *Metamorphoses*. While the wine is going round at the festive board of Cepheus, Lyncides at the request of Perseus gives the hero some general information about the manners and habits of the Æthiopians. Then

Qui simul edocuit “Nunc, o fortissime,” dixit
 “Fare precor, Perseu, quanta virtute, quibusque
 Artibus abstuleris crinita draconibus ora.”

Narrat Agenorides gelido sub Atlante jacentem

- 5 Esse locum solidæ tutum munimine molis,
 Cujus in introitu geminas habitasse sorores
 Phorcydas, unius partitas luminis usum :

- Id se sollerti furtim, dum traditur, astu
 Subposita cepisse manu : perque abditæ longe
 10 Deviaque et silvis horrentia saxa fragosis
 Gorgoneas tetigisse domos : passimque per agros
 Perque vias vidisse hominum simulacra ferarumque
 In silicem ex ipsis visa conversa Medusa :
 Se tamen horrendæ clipei, quod læva gerebat
 15 Aere repperusso formam aspexisse Medusæ :
 Dumque gravis somnus colubrasque ipsamque tenebat,
 Eripuisse caput collo : pennisque fugacem
 Pegason et fratrem, matris de sanguine natos
 Addidit, et longi non falsa pericula cursus :
 20 Quæ freta, quas terras sub se vidisset ab alto,
 Et quæ jactatis tetigisset sidera pennis.—Met. IV. 769—789.

When what was asked for had been told, he said,
 “Now, prithee, Perseus, bravest of the brave,
 Come tell us with what force and by what means
 Thou did'st remove the dragon-crested face.”
 Th' Agenor-sprung begins, and tells how lies
 A place 'neath chilly Atlas, guarded well
 By natural bulwark of the mass entire ;
 How in the entrance sisters two there dwelt,
 From Phorcys sprung, who shared a single eye ;
 How this, while furtive in the welkin passed,
 He took with dex'trous hand placed underneath :
 And how he reached the Gorgon dwellings, rocks
 Far, far remote, straggling, and quaking all
 With jarring fragments ; and how everywhere
 Through suburbs wide and passage ways he saw
 The simulacra of wild beasts and men
 Changed, like for like, to quartz by Gorgon ken :
 How, still, the orb's, the rough Medusa's shape
 He gazed on in deflected air, because
 She eastward bore ; and how while slumber deep
 The snakes and her possessed, he sheared her head.
 Of the winged Pegasus and Geryon,
 Sprung from the mother's blood, he also told ;
 Th' unvarnished ventures of his own long flight,
 What floods, what fields beneath he saw on high,
 And to what heights his outspread wings drew nigh.

NOTES.

- 4—9.—The wind came from the chilly Arctic regions, says Ovid, and, as being heavier, slipped under (*supposita manu*) the Cirri, the highest (cujus in introitu) and coldest of the clouds ; from these, through compression and superior dryness, it removed the condensation and cold whereby they were rendered visible.

- 7 unius luminis.—The poet does not make mention of the “tooth,” for the reason, it is to be supposed, that *cold* will also produce condensation.
- 8 astu.—The Greek *ἄστν* usually denotes “the upper town,” and Ovid applies it to the upper heavens.
- 9 per longe.—One word, *perlonge*, like the *permagnos* of Horace.
- 10 silvis.—“Stock, or plenty of matter—matter brought together” is one of the recognised meanings of this word. The fragments were to the molten surface what the trees are to woodland.
- 12 simulacra in silicem.—The floating fragments were, according to Ovid, of a siliceous, quartzose, or flinty nature. Silica is one of the main constituents of the granite and fundamental rocks, from the crumbling of which the earthy matter of man and other organised beings is composed.
- 13 ex ipsis.—“According to themselves, like for like.”
visa.—The Latin *video*, Greek *εἶδω*, and English “ken,” imply not alone “to see,” but also “to know, to have knowledge of, to have close connection with.”

“And Adam knew Eve his wife.”—Gen. iv. 1.

- 14 horrenda.—“rough” from inequalities on the surface, and rough from the jarring, jostling, and din of the floating fragments.
clipei.—This and “*horrendæ Medusæ*” are in apposition.

The force and meaning of the lines will be better understood by remembering how the great polar atmospheric current is said to behave when arriving at the equatorial regions. Owing to the earth's revolution round its axis from west to east in 24 hours, there is for objects on its surface a constantly diminishing velocity from the maximum of about 1,000 miles an hour on the equator to 860 miles at latitude 30°, 500 at 60°, and so on till we reach the poles, where the velocity is nothing.

“From this it follows that a wind blowing along the earth's surface in the direction of the equator is constantly arriving at places which have a greater eastward velocity than itself. As the wind thus lags behind, these places come up, as it were, against it, the result being an east wind. Since, therefore, the wind north of the equator is under the influence of two forces—one, the low pressure near the equator, drawing it southwards, and the other, the rotation of the earth, deflecting it eastwards—it will, by the law of the composition of forces, take an intermediate direction, and blow from north-east. For the same reason, south of the equator, the south is deflected into a south-east wind.”—*Encyc. Brit.*

It is this “lagging behind” or “beaten back” of the wind, as also its “deflection” from a north or south to a north-east or south-east wind, that Ovid marks by the term “*aere repercusso*.”

læva.—"Medusa," the clypeus or orb of earth, is understood.

Ferrel, and before him Poisson, enunciated the general law that "in whatever direction a free-moving body passes along near the earth's surface, there is a force arising from the rotation of the earth upon its axis, which deflects it to the right in the northern hemisphere, to the left in the southern."

The use of *lævus* in Latin is ambiguous, astronomically applied, since it means "favourable" or "unfavourable," or right and left, according to the relative positions of augur and spectator. It is for this ambiguity that Ovid uses the word, so that it might apply to either hemisphere.

- 16 *gravis somnus*.—The wind arrived at an opportune time, when the surging billows of fire were comparatively at rest.

In his *Theogony*, Hesiod simply says: "Perseus cut off her head," *κεφαλὴν ἀπεδειροτόμησεν*. But in his "Shield" we are presented with the following vivid picture of the hero, armed cap-a-pie, and flushed with the triumph of his deed:

- ἐν δ' ἦν ἡῦκόμου Δανάης τέκος, ἱππότα Περσεύς,
οὔτ' ἄρ' ἐπιψαύων σάκεος ποσὶν οὔθ' ἐκὰς αὐτοῦ,
θαῦμα μέγα φράσσασθ' ἐπεὶ οὐδαμῇ ἐστήρικτο.
τὼς γάρ μιν παλάμαις τεύξε κλυτὸς Ἀμφιγυήεις.
5 χρύσεος· ἀμφὶ δὲ ποσσὶν ἔχε πτερόεντα πέδιλα.
ᾧμοισιν δέ μιν ἀμφὶ μελάνδετον ἄορ ἔκειτο
χάλκεον ἐκ τελαμῶνος· ὁ δ' ὥστε νόημ' ἐποτᾶτο·
πᾶν δὲ μετάφρενον εἶχε κάρη δεινοῖο πελώρου,
Γοργοῦς· ἀμφὶ δέ μιν κίβισις θέε, θαῦμα ἰδέσθαι,
10 ἀργύρεη· θύσανοι δὲ κατηρεῦντο φαεινοί,
χρῦσειοι· δεινὴ δὲ περὶ κροτάφοισιν ἄνακτος
κεῖτ' Ἀἴδος κυνέη νυκτὸς ζόφον αἰνὸν ἔχουσα.
αὐτὸς δὲ σπεύδοντι καὶ ἐρρίγοντι ἐοικῶς
Περσεὺς Δαναΐδης ἐτιταίνεται.—216.

And in it too was trim Danae's son,
The rider Perseus, of a high degree,
Nor touching with full pressure on the shield
Nor yet far off from it,—a wonder great
To ponder deeply in the mind upon,
Since nowhere fastened had he been; for thus
The fabricator shaped him with his hands.
Winged sandals had he 'bout his feet; a sword
Keen-tempered, bare, and edged all round with black
His shoulders graced; and like a thought he flew.
The space entire within his midriff held
The horrible, convulsive Gorgon's head;
Encircling him all round there flashing ran,

A wonder to behold, impulsive force,
 And surface fringes crowding hung therefrom ;
 And round his brows lay Pluto's helmet dread
 That holds the fear-inspiring black of night.
 But Perseus' self, Danae's son, was stretched
 Like to one pressing, quivering with cold.

NOTES.

- 1 ἡῦκόμων.—The word can be derived from ἡῦς, and κομάω or κομέω, “well-plumed, well-equipped; well put in order, well-adjusted.” Danae, as the elementary covering, would fit the surface close, and be ready for future order and adjustment. In English, both ideas are best expressed by “trim.”
- ἱππότα.—“The rider” of the wind. Aeronauts have travelled at the rate of a mile a minute in the upper regions when a speed of but a quarter of a mile was noted in the same interval of time below. What, then, must the astonishing speed be *above*, of a storm which travels on the surface at the rate of 100 miles an hour?
- χρῦσεος.—Used as a simile. Just as we say “golden drops” for rain, “a golden harvest” for wheat, “golden hair,” in reference to the *utility*, *worth*, and *colour* of the metal, so does Hesiod apply the well-known characteristic of *heaviness* to the degree of pressure exercised by wind.
- 2 ποσιν.—The word is evidently used after the same fashion as κατὰ πόδας, “with all the power of one's feet; with full speed; with full pressure.”
- 3 θαῦμα μέγα.—The ordinary pressure of the atmosphere at the sea level is 15lbs. on every square inch of surface. On a mass of ordinary size the pressure is consequently about 30,000 lbs.: the weight of the whole atmosphere surrounding our globe has been computed to be equal to that of a globe of lead 60 miles in diameter. And yet, θαῦμα μέγα φάσασθ', the pressure is not inconveniently felt by either man or earth!
- 4 Ἀμφιγυῖεις.—Ovid, when describing the winds, writes thus:
 “His quoque non passim mundi fabricator habendum
 Aera permisit.” Met. 57.
- 5 πτερύοντα πέδιλα.—To denote the *velocity*, as ἄορ in the following line denotes the *keenness* of the wind.
 “The wrathful winter hastening on apace,
 With blust'ring blasts had all ybared the treen,
 And old Saturnus with his frosty face
 With chilling cold had pierced the tender green.”—Dorset.
- 6 ἀμφὶ μελάνδετον.—All great storm winds are, as a rule, accompanied by a darkening band of clouds. “In a cyclone the broadest feature of weather is an area of rain about or rather somewhat

in front of the centre, surrounded by a ring of cloud, outside which the sky is clear.”—Encyc. Brit.

So does Ovid say of Perseus—

“Nunc huc, nunc illuc, exemplo nubis aquosæ

Fertur.”

Met. IV. 622.

7 *χάλκεον*.—“Brazen, hard; well or keen tempered.”

8 *μετάφρενον*.—The literal meaning of the word is (*μετὰ φρένος*) “in the midst of the midriff.” As an instance of the carrying power of wind the following is quoted from the Encyc. Br.: “The tornado which passed over Mount Carmel (Illinois), June 4, 1877, swept off the spire, vane, and gilded ball of the Methodist church, and carried them bodily 15 miles to north-eastward. The velocity of the ascending current which kept this heavy object suspended in the air for 15 or 20 miles must have been very great.”

9. *κίβις*.—*κίω βία*, “moving force,” or as we say, “kinetic energy.” In all extensive severe storms there is present a *storm centre* that has a progressive motion of its own, and a system of *surface winds*, some of which blow in towards the storm centre, while others move in outward spiral currents. The storm centre is the *κίβις*, and we find, in confirmation, the word written as *κύβις* (*κύος* or *γύα βύνω*), “moving in the centre or womb.” The *surface* or *visible* currents are the “*θύσαντοι φαεινοί*” that crowd with *pressure* (*χρύσειοι*) round the centre of the storm.

Let us now refer to and review briefly the recital of the exploit as given by Apollodorus:

Guided by fluxion (Mercury) and organised procedure (Minerva), the wind or cold wave comes from the glacial regions of arctic space. It is colder, and consequently drier and heavier, than the surrounding air. Owing to this heaviness it slips under the banks of clouds and steals from them through compression, and possibly in virtue of its own dryness and superior coldness, the condensation and the cold wherewith they digested their food and saw the light of heaven. Now since ascending currents of air are known to become moister with every degree of ascent, and descending currents drier with every addition of descent, our cold wind would on going down become drier and colder, and would meet with ascending currents of different velocities and temperatures, whereby the processes of cloud-making would be again renewed, the latent heat would be liberated,

and the temperature lowered. Its original characteristic thus resumed, it would acquire from the innate forces of the air—for wind and weather have their own nymphal or innate laws, some of which we are not well cognisant of—velocity, kinetic energy of a vorticose order, and the pall of gloom that ever bodes a storm. The last would crown its head; the second would be its garment—a bag of wind, as the historian says it is called in common parlance (*τὴν κίβισιν, ἣν φασιν εἶναι πῆραν*); the first would be placed most effectively on its lower extremities, as in its course from pole to equator the velocity would be more needed at the latter.

Equipped with these and with the keen bitter blast derived from rapid motion, our wind, flying through the vapoury billows of the atmosphere, comes finally to the half molten, half scummy surface of our globe, and at an opportune moment when the raging fire and jostling fragments are in a comparatively tranquil condition. What followed? Science has told the sequel; Ovid and Horace have told their tale; it is but right that Apollodorus should tell his and in his own tongue:

*ἐπιστὰς οὖν αὐταῖς ὁ Περσεὺς κοιμωμέναις, κατευθυνούσης
τὴν χεῖρα Ἀθηνᾶς, ἀπεστραμμένος καὶ βλέπων εἰς ἀσπίδα
χαλκῆν, δι' ἧς τὴν εἰκόνα τῆς Γοργόνης ἔβλεπεν,
ἐκατόμησεν αὐτήν.—2. 4. 2. 8.*

It is the self same story and the self same ending. Our bitter wind swooped over the molten fire and fragments while at rest, and prepared itself to give the final blow. Even then it might have failed were it not that the organised directress of nature, who presides as well over the composition of forces as she does of bodies, stayed his impetuous advance and guided his hand aright. The wind god changed his course from a direct to an indirect one, turned aside from north and south to north-east and south-east, and so of necessity viewed the reflection of his prey in the condensed orb of air (*εἰς ἀσπίδα χαλκῆν*), while he proceeded with that work of regelation and consolidation which deprived the Gorgon of her head and robbed our globe for ever of its light. With the grisly head within its vorticose

midriff, the cold blast rushed onwards enveloped in dread darkness, while pursuing it from below there surged and spouted wave on wave of molten matter that had rent the tender crust.

Through many other adventures and hazards did this Perseus, this "vindemiator," as Horace calls him, proceed; but no further shall we follow him for the present. We need only remark that he kept the Gorgon's head for many a day till consolidation was secured by petrification. This accomplished, he with his spouse, Andromeda, retired to Tiryns where he still may be, for we have no record of his death. But previous to his retirement, he gave the sandals, kibisis, and helmet to Mercury, who, as Apollodorus tells us, "restored them to the nymphs, as being fore-ordained for them."

Ἐρμῆς μὲν οὖν τὰ προειρημένα πάλιν ἀπέδωκε ταῖς νύμφαις.—2. 4. 3. 7.

The Gorgon's head he gave to Minerva, who placed it in her shield. It is there still.

"Through knowledge we behold the world's creation,
How in his cradle first he fostered was;
And judge of nature's cunning operation,
How things she formed of a formless mass."—*Spencer.*

Science is the systematic and organised arrangement of knowledge; and it is in the tomes and books and pamphlets, which science has arranged for shield, and called the Circle of the Sciences, that we behold this head, this light of other days. With this shield and this light has Science petrified its foes, and petrifies them still. It is the *ἀγελεία*, the "virago," the driver of men, and has done yeoman service in the fight for progress. It has its darker side, however, begotten of the hydra-headed laws and canons with which the ægis is equipped; for Science is proverbially a cold goddess and an arbitrary, who frowns upon the ardent advances of a Vulcan, and looks askance at Eros when he comes too near: and then, as Young says,

"Your learning, like the lunar beam, affords
Light, but not heat; it leaves you undevout,
Frozen at heart, while speculation shines."

Thus, then, ends this o'er-true narrative of Medusa.

Earth's incandescence was gone for good and aye, and our orb became a planet—a Lazarus dependent on the crumbs that fall from that greater orb for which it is no task to shine.

The light had fled on high, and all that remained of the Gorgon was her warm trunk below. There, *in foribus*, did Æneas spy it when the Sibyl led the way to Hades. To the same region, but further in, did Ulysses penetrate, and thence, after beholding the wives and daughters and the sons of heroes dead and gone, after gazing undismayed on Tityus and Tantalus, Sisyphus, and the simulacrum of Hercules himself,—thence he turned and fled in terror at the bare idea of seeing the Gorgon's head. There, too, does Science place it when it asserts that there is no fact more evident or more important than that the temperature invariably rises as we penetrate towards the centre, and at the average rate of 1° F. for every 50 ft. or 60 ft. of descent; and that at the depth, it may be, of 100 miles below the surface, even the least fusible mineral masses may be in a state of incandescence.

CHAPTER XI.

THE MISSING GARMENT.

Chrysaor.—The first solid crust that covered the molten matter of our globe is interesting in many particulars. Its date, the length of time occupied in its formation, its mode of formation, whether it was formed in globo or in detached pieces, what portions of the globo were first encrusted, the nature of its materials, and its possible existence to-day,—all these have been matter of much debate and curiosity.

Reason convinces us that there must have been a *first* crust; but all exploration has hitherto failed to find any indubitable traces of it. We have never got below the granite, and yet the strong belief is that this rock is not the primal crust. “Whether any relics,” says Bonney, “of the Primeval Crust can still be recognised is a matter of conjecture.” “The crust,” writes Gunning, “which first hardened over a molten incandescent globe, nowhere appears: the oldest rocks are everywhere buried under their own ruins.”

This being so, all remarks as to the nature of its material must be more or less conjectural,—the strong opinion, however, being that it must have been crystalline or crystallized in character. “The original crust may have been of a glassy character, like some of the vitreous lavas; but whatever it was, no trace of it has ever been or is ever likely to be found.”—*Encyc. Brit.* Winchell has already mentioned the crystalline nature of Earth’s first solid covering. He says further: “It was a mixed conglomerate of crystalline fragments, such as we now witness in some of the granites, which are mixtures of quartz, feldspar, and mica; or the syenites, which are mixtures of quartz, feldspar, and hornblende; or the diorites, which are mostly mixtures of feldspar and hornblende. Or, perchance, the

solidification took place under such circumstances that the crystallisation was more obscure, as in the various dolerites, which everyone admits to have been born of fire."

The same doubt, of course—greater, if possible—rests over all the other points connected with it. Bonney says: "There is no evidence when the Earth first solidified that every part of its vaporous envelope was in a perfectly uniform condition, or the surface beneath completely homogeneous in composition and in state. Some parts of the exterior may have solidified before other parts, and the crust, when formed, may not have been as thick in some parts as in others. When the atmosphere had reached its present condition, if not before, the sun's heat must have had more effect in equatorial than in polar regions, so that the crust would stiffen and thicken rather more rapidly near the polar than near the equatorial region."

Its probable mode of formation has been already pointed out; its date was evidently subsequent to the termination of the incandescent period; and the time taken to establish a solid crust, that would permanently hold its own over the molten fire below, is not known.

The classic poets must have indulged in conjectures similar to our own as regards the first crust. Ovid introduces Perseus as flying over Libya, then he transports him to the Hesperian or Western hemisphere, and finally to Æthiopia. Remembering that Perseus came first from places "*gelido sub Atlante*," Ovid would seem to imply that the Polar regions were first solidified, then the Temperate, and lastly the Equatorial. The same poet gives us also the idea of a vast length of time being involved in the solidifying process. Not to mention what elapsed later on, he speaks thus of Perseus immediately after his exploit and previous to his experience on the Hesperian shores:—

*Inde per immensum ventis discordibus actus
Nunc huc, nunc illuc, exemplo nubis aquosæ
Fertur, et ex alto seductas æthere longe
Despectat terras, totumque supervolat orbem.
Ter gelidas Arctos, ter Cancræ brachia vidit:
Sæpe sub occasus, sæpe est ablatas in ortus.*—Met. IV. 621.

We have also seen his use of "in silicem" as pointing out the quartzose or siliceous nature of the material constituting the crust. In view of incandescence being cut off, no better material than silica can in one sense be imagined for the crust, since, as is well known, quartz intercepts light but transmits heat. Hesiod in his use of "*πανεφθου κασσιτέριοι*," Shield 208, seems to strengthen Winchell's theory of a mixed crystalline conglomerate.

Putting by, however, all more or less nebulous conjectures from either source, and coming down to facts, we find Science on the one hand asserting that there was a primal crust, that it sprang from incandescence, and that no vestiges of it have been found; and Mythology, on the other hand, asserting that there was a Chrysaor, who sprang from Medusa, and who has not been seen by the eye of man—for that is what *Χρυσάωρ* means (*χρῶς ἄοραω*) "the unseen crust" (*υ* and *ω* being interchangeable, as in *χελύνη* for *χελώνη*). There is thus a complete accordance between the two.

Let us digress a little here and say that, according to the mythological record, Life had long since come into being; and not only life, but an organised life, too, that had sprung ready armed from the cloven head of Zeus, and that had assisted Neptune and Perseus in their onslaughts upon Medusa. We mention this principally for the reason that early text-books on geology deny the existence of life in Archæan time, owing to the absence of any fossil remains in the rocks of this period. It is well to notice, however, that a supposed fossil, the Eozoon, has been discovered of late; and that, even apart from this, the general opinion of modern geologists trends to the belief that the mere non-discovery of fossils does not suppose their non-existence; that in the primeval days of earth organised beings, suited to the conditions round them, may have flourished, the remains of which could be so transformed by heat and crystallisation as to render them totally unrecognisable. "As well," says Agassiz, "might we expect to find the remains of fish, or shells, or crabs at the bottom of geysers

or of boiling springs, as on those early shores bathed by an ocean of which the heat must have been so intense." Anderson remarks, "A productive flora, then, may have existed from the earliest period, all traces of which may have been obliterated."

The reign of Chrysaor was a long one, a stormy, and undoubtedly a most important one for earth in several particulars. Many a geological incident and mythological story—the two are inseparable—are woven round it. Let us throw a flashlight on a few.

The newly-formed crust for which Life fought would here and there be shattered, ripped, and overflowed by the fires below, the intense heat of which would reduce the components of the crust, the water on it, and the air above it to their original molecules; again would the crust solidify, and this time stronger than before; again would it be reduced to molecularity; and so on till consolidation was fully achieved, till the granite and the schists sealed up the fire, and the molecule-making forces were pent up below: those were the days when Gods and Titans fought for supreme sway, and faced one another for the final struggle; when Zeus collected all those forces that we read of in order to put forth all that strength which finally ended in the defeat of the Titans and their precipitation into Tartarus.

Sparse and poor, fungous and unicellular, must have been the life upon that early and fervid crust; yet, such as it was, it was *Life*, the lord of creation, jealous of innovations, and quick to resent whatsoever revolutions threatened its dynasty, even though revolution meant progress: those were the days when Prometheus, the crafty son of Iapetus, stole and concealed within a hollow narthex the far-seeing light of fire for the benefit of mortals.

The crust, though often shattered, as we have seen, grew ever stronger and thicker till it finally succeeded in hiding the fire below, in cooling as to itself, and in growing more and more dependent on the sun for heat: those were the days when Zeus withdrew from mortals the fire which Prometheus had stolen.

That same crust which first enveloped earth and witnessed the dawn of life, is no longer visible; it was bent and broken, upheaved, ground, denuded, and spread in finest particles over land and sea, so as to fashion the formation that succeeded; that too, after its long span, underwent the same mutations; and so with the next and the next, and with each that followed, down to that particular formation trodden by Adam, who was himself formed of the earth he trod on; nothing has been added from above, and consequently the primeval crust of which we speak must, in whole or in part, have permeated every formation that followed in its wake; those were the days and this the Scythian or hidden (κεύθω) rock to which, as some writers affirm, Prometheus was originally chained by Vulcan, and with which he was hurled to Tartarean depths, because he had offended Zeus.

All these will be spoken of at more length in their proper place; they are introduced here principally for the purpose of establishing what may be called Mythological Chronology, of inducing the belief that we must look to the primal crust and to the conditions under which it was formed, when endeavouring to explain some of the earliest and most interesting of the mythical characters and the historical garb with which they are invested.

The myth describes Chrysaor as wedded to Callirrhœ (καλλι-ῥέω), "the beauteous flowing" daughter of Oceanus. It is even so, for next to confining the molten sea below, the most immediate and important function of the crust was to receive and cherish, for better and worse, the waters coming to it from the vaporous ocean above. "Just as soon," says Hooker, "as solidification took place on the surface of the great melted ball which once constituted our earth, a large part of the steam surrounding it was condensed into water, which of course fell in rain. At the same time, the forming crust, as is the case with all matter except water, in passing from the melted to the solid state, contracted, and this contraction crumpled it into folds, regular and irregular, and thus made channels and cavities for the water to run

and dash in. Water thus began that great work of denudation which . . . it has been carrying on ever since. From that denudation in this first age of the world was supplied material for the strata of the grand Azoic floor which covers up the fiery deeps within, and upon and against which the rocks of after ages were laid."

CHAPTER XII.

THE WINGED STEED.

Pegasus.—Chrysaor and Callirrhoë have come, the fiery furnace is being well-sealed, and an ocean of waters flows upon our globe. Prometheus, as an offset to the fire withdrawn, has stolen it from Helios, and the effects of the sun begin perceptibly to be felt. In what way? In many—heat, light, vivifying influences,—but first and foremost in what we call *Evaporation*, and Mythology calls *Pegasus*. With the first drop of water that rested on our globe was the process felt as vaporisation; with the first rocky covering indeed, it may be said, that surrounded earth was it felt, for no substance that we know of, not excluding even flint, is free from water. “Rocks,” to quote the *Encyclopædia Britannica*, “which have undoubtedly once been in a fluid or at least pasty condition, and which have been injected as veins and dykes into previously consolidated masses, contain water imprisoned within their component crystals. This is not water which has been subsequently introduced. It is contained in minute cells, which it usually does not now completely fill, but which it no doubt did occupy completely at the time and temperature at which the rock was consolidated. . . . In the solid crystals of lava which were erupted only recently, as well as in those of early geological periods, the presence of water in minute cavities may be readily detected. It is in the quartz of such rocks, and still more in that of granite, that the detection of water-cavities is most easily made. The quartz of granite is usually full of them.”

Coincident with the crust, then, would vapour spring heavenward from the surface; and the process that commenced when incandescence ended has never ceased.

It never returns; it is always the rain, or snow, or hail that leaves ethereal mansions for our earth; it is the vapour that always leaves earth for heaven, the vapour that mounts its winged steed and flies upon the sunbeam to the heights above. This most prominent characteristic of vapour it was that gave Pegasus his name, Πήγασος, (βῆ γῆς, π and β being interchangeable) "springing from the earth," and the same derivation evidently applies to πηγὴ, "a well or spring."

At a high temperature water will boil and fly off as steam, or vapour: this is called Vaporisation, and implies rapid action and more or less artificial agency. At ordinary temperatures, at all seasons, in all climates, and from all kinds of matter, there is a slow natural process going on from the surfaces of bodies whereby vapour is raised up without ebullition or other disturbance of those bodies: this is called Evaporation, and everyone is familiar with the process.

We see the outbursts of an immense volcano and are struck with the vast volumes of vapour that go curling upwards: we see the mist rising in the calm of a summer evening from the juicy flats and meadows, and rolling upwards, like an inundation, over the visible horizon. But immense though they be, they are puny in magnitude, artificial in nature, and mere darkeners of the sky when compared with the simple, quiet, diaphanous, and enormous mass of vapour raised daily and hourly by the force of Evaporation from land and sea alike. Mountain high and curling as it goes, a veritable Helicon (Ἑλικὸς), does this mass rise from off the surface of our globe, gladly responsive to the creative hymn. Higher and still higher does it go while the refrain goes on, and while still the heaven's blue is clear. Like an intellectual giant that soars to heights beyond the ken and range of wordy vaporers, so has it left far below the fog-producing and sulphur-reeking efforts of Pierian marsh-lands and volcanoes; it has even dispersed their darksome fumes, and still goes up, up till the winged steed has lost some of his elastic vigour, till he grows thirsty

and drinks his full. Then, satiated with the delight of his own being, or influenced it may be by the friendly counsels of the water-god within, he rears with the joy of surfeit, stamps this Helicon of vapour with his hoof, stamps it to condensation, and straightway does a Hippocrene appear! What is vapour, then, but the *source*, the *κρήνη* of every spring and well and Bandusian fount upon our globe? All that it requires is the last *kick*, so to speak, of the elastic force which rides it, in order to become condensed to clouds and fall as rain and snow, which in their turn penetrate the crevices of earth and produce springs. The rivers are fed by springs, the springs by rain, rain by condensed vapour, which is thus the source or Hippocrene of all.

There remains little else to be said except that Evaporation increases with the break of morn,—hence has Pegasus been made the horse of Aurora; and that it is generally believed to be a prime factor in the production of electricity in the atmosphere, as noticed carefully in the original myth. His special office as the horse of the Muses is of course but the intellectual adaptation of the physical meaning, and is graphically outlined thus by Pope:

“A little learning is a dangerous thing;
 Drink deep or taste not the Pierian spring:
 There shallow draughts intoxicate the brain,
 And drinking largely sobers us again.”

Hesiod's account of the Gorgon sisters could not be suitably inserted previous to the present. By giving it now in conjunction with that of Chrysaor and Pegasus, the connection between incandescence and incrustation will be better marked. Having told how the Graiæ were sprung from Phoreys and Ceto, he continues as follows:

Γοργούς θ', αἱ ναίουσι πέρην κλυτοῦ Ὠκεανοῖο,
 ἐσχατιῇ πρὸς νυκτός, ὣν' Ἑσπερίδες λιγύφωνοι,
 Σθεινώ τ' Εὐρυνάλη τε Μέδουσά τε λυγρὰ παθοῦσα.
 ἡ μὲν ἔην θνητή, αἱ δ' ἀθάνατοι καὶ ἀγήρω,
 οἱ αἱ δύο· τῇ δὲ μὴ παρελέξατο Κυανοχαίτης
 ἐν μαλακῷ λειμῶνι καὶ ἄνθεσιν εἰαρινοῖσι.
 τῆς δ' ὅτε δὴ Περσεὺς κεφαλὴν ἀπεδειροτόμησεν,
 ἔκθορε Χρυσάωρ τε μέγας καὶ Πήγασος ἵππος.
 τῷ μὲν ἐπάνυμον ἦν, ὅτ' ἄρ' Ὠκεανοῦ περὶ πηγὰς

- 10 γένθ', ὃ δ' ἄορ χρύσειον ἔχεν μετὰ χερσὶ φίλῃσι.
 χῶ μὲν ἀποπτάμενος, προλιπὼν χθόνα μητέρα μήλων,
 ἵκετ' ἐς ἀθανάτους· Ζητὸς δ' ἐν δώμασι ναίει,
 βροντὴν τε στεροπὴν τε φέρων Διὶ μητιόεντι.—Theog. 274.

The Gorgons too she bore, who dwell at large
 From sounding ocean to th' extreme of night
 Where the high-toned Hesperides are placed,—
 Stheno, Euryale, Medusa too,
 The woe-distraught: immortal, undecayed,
 The former two; mortal alone was she.
 With this one lay the ruler of the blue
 In the unwrinkled plain and early bloom.
 From her, when Perseus sheared her head, there sprang
 Chrysaor prime, and Pegasus the steed.
 Auspicious was the name for each, because
 One held a golden sword with out-stretched hands,
 The other rose from near the ocean's springs:
 Then taking wing and soaring from the earth,
 The mother of all fruits, to Gods he came;
 And dwells in halls of Zeus, delivering
 Thunder and lightning for the Life that plans.

NOTES.

- 1 ναίουσι.—The great inner movements, or active agencies of seismic and volcanic disturbance extend all over our globe, or from the equatorial regions where ocean prevails to the poles.
 2 ἐσχατιῇ.—The Hesperides, as already explained, mark “the obscure or unknown” in all things. Geographically they would mean any portion of earth's surface not well known or altogether unexplored; but the context points to these particular Hesperides as being the elevated polar regions (λιγύφωνοι “high-toned, elevated”) where the extreme of darkness (ἐσχατιῇ πρὸς νυκτός), six months of night each year, is experienced.
 5 Κυανοχαίτης.—The usual meaning assigned the word is “dark-haired” (κύανος χαίτη); but Ovid, when describing the same incident, Met. IV. 798, says:

“Hanc pelagi rector templo vitiasse Minervæ
 Dicitur.”

So that “pelagi rector” would seem to be the Latin form for Κυανοχαίτης, the derivation of which would be κύανος ὀχέω or κύανος ἔχω “that which sustains, holds, or governs the κύανος.”

What the “κύανος” really was is a matter of debate; that it was of blue colour is generally conceded, and the application of “blue” to the sea (pelagi) by Ovid strengthens the opinion.

- 6 μαλακῶ—“soft, smooth, unwrinkled.” The wrinkles or corrugations were to come later on with the new-formed crust.

Ovid expresses the same idea in his Golden Age:

"Ipsa quoque immunis rastroque intacta nec ullis
Saucia vomeribus, per se dabat omnia tellus."

ἀνθεσιν εἰλιπνοῖσι.—Early in the incandescent period when Medusa had golden hair. Compare Ovid's lines in his Golden Age:

"Ver erat æternum, placidique tepentibus auris
Mulcebant Zephyri natos sine semine flores."

Hesiod uses the same two words for "a wealth of hair" (Works and Days, 75).

- 8 μέγας.—"Great" in the sense of *prime* or first. So do we say "a prime scholar," "the prime of manhood," "prime numbers."
 - 9 ἐπώνυμον.—The word shows that πηγὴ and χρύσειον ἄορ are *not* to be considered as the radicals of Pergasus and Chrysaor; rather as fortuitous resemblances, as in the case of the Cyclopes.
 - 10 ἄορ χρύσειον.—"What," says Hutchinson, "is the source of the gold and silver and other metals found in mineral veins? This question cannot as yet be fully answered. Some geologists look upon the sea as the source, since small quantities of various metals are found in sea-water. But it is possible that the source is far down below in the depths of earth, and that by means of steam and highly-heated water during periods of volcanic activity, they were erupted and injected into fissures in the crust."
- χερσὶ.—It has been remarked of metalliferous veins that they usually strike *east* and *west*.

CHAPTER XIII.

HOW THE MOUNTAINS WERE "LIFTED."

Geryon.—Our continents in their present forms and dimensions are the finished work of a geologic yesterday. The Tertiary period looked on while Nature, with a skill begotten of long experience, was painting and finishing her work ; Post-tertiary times saw it when undraped and open for exhibition. It was not the first time that the artist had tried her hand at continent-making. Again and again in the ages previous to those mentioned had she put forth her efforts and placed the same on view : again and again had she looked upon her work with a critical and disapproving eye, and washed out the pigments from the canvas. Never from the first, though, could it be called a perfect *tabula rasa*, for some few outlines sketched with unerring hand always remained as evidence of her maiden trial and of the grand idea that she had formed in imagination.

The picture sketched in sombre Silurian colours, erased, and reproduced in brighter Devonian reds, retained the master-lines of Archaic days ; so too did the chiaro-oscuro of the Carboniferous, the nondescript of the Permian, and the foamy white of the Cretaceous ; so did every other reproduction of the work, even to this the latest which we see to-day. Those germinal outlines are the mountain chains, the backbone around which our continents have grown bit by bit and shaped themselves to their present huge proportions. "Continents," says Winchell, "have been developed, like organisms, from their primeval germs. Geologic force, like vital force, operates always towards the accomplishment of some definite end. . . . The outline of the Continent was consequently marked out while yet in embryo. The foundations of the Alleghanies and Rocky

mountains were laid ages before the superstructure rose above the waves."

"The inference to be drawn from these facts is that the present continental regions, through many local oscillations, have existed as terrestrial ridges from a remote geological antiquity, and that the ocean basins in like manner have, on the whole, retained their identity. When the geologist asks himself how the present distribution of sea and land is to be accounted for, he finds that the answer to the question goes back to early Palæozoic times, whence he can in some cases trace the gradual growth of a continent downward through the long cycles of geologic time."—*Encyclopædia Britannica*.

From the very beginning of our crust, therefore, was the plan of our continents laid down at the bottom of the ocean which embraced the globe, and this plan exhibited itself at first and for many a succeeding age in the form of terrestrial ridges that were occasionally elevated and again submerged as the years flew by.

How those germs of continents came into existence is still somewhat of an unsolved problem. The most accepted opinion is that they originated in the corrugations or wrinkles into which the early crust was thrown, owing to unequal contraction on the part of the fluid interior and of the solid exterior. "In the process of refrigeration," writes Winchell, "the stiffening crust would become too large for the nucleus within. This would necessarily result from the more rapid contraction of the more highly heated portions. If the solid and the molten portions suffered equal losses of heat, the molten, by shrinking the most, became too small for the enveloping crust. The crust therefore must wrinkle to fit the shrinking nucleus. Thus incipient inequalities of the surface began to appear: these were the germs of mountains and of continents. From a new-born wrinkle grew the lofty Cordilleras."

In much the same fashion does writer after writer express himself, all agreeing on the one fact, however they may differ in non-essentials, that our continents date their existence

from a primal crust surrounded by a world of waters. The same fact is enunciated in Mythology when it says that the three-headed Geryon was sprung from Chrysaor and Callirrhoë. The genealogy is plainly indicative of the date and origin. If name, epithets, description, and allusions count for aught, then there is evidence enough, and more than enough, to prove that Geryon is the personification of the beginning of our continents. The name alone, Γηρυών or Γηρυόνης (γῆ ῥύω), "the wrinkling or corrugating force of earth," is enough in itself to bring conviction. The three heads and one body, or three bodies united together, as pictured by some, evidently refer to our continental areas according as we view them *on* the surface, or united together in the *depths* of earth. Æneas, when descending to Hades, saw Geryon in the latter aspect :

Centaury in foribus stabulant, Scyllæque biformes,
Et centumgeminus Briareus, ac bellua Lernæ
Horrendum stridens, flammisque armata Chimæra ;
Gorgones, Harpyiæque, et forma tricornis umbræ.

Æn. vi. 286.

Horace associates him with the depths of earth and ocean :

Non, si trecentis, quotquot eunt dies,
Amice, places illacrimabilem
Plutona tauris, qui ter amplum
Geryonen Tityonque tristi
Compescit unda.—Odes II. 14.

The three heads and his wealth of oxen are the main characteristics of Geryon, and each will not suffer from a few words of explanation.

To the Greek poets, and the Latin also, the mountains were βόες, boves, "the oxen of the earth." This will be plainly evident in classical passages to be quoted as we go along. From βουνός, "a hill," a little βούς or mountain as it were, our own "mountain" and the Latin *mons* are derived through the recognised interchange of β and μ. Concerning the derivation of βούς and our own "bull," it may be said that the Greek βάινω and βάλλω have much in common as to the character of *motion*. The former signifies "to tread, step ; go away, depart ; to drive up or down,

to lift, to hurl;" the latter means "to throw, cast, hurl; to strike; to let fall, move, to go."

The Greeks probably derived their βούς from βαίνω, adopting the *slow, peaceful* idea of motion as suited to the animal; we, on the other hand, would appear to have adopted the *minatory* idea involved in βάλλω, and applied it to "bull," just as we have applied the *rapid* idea of the same word to "ball." Just, then, as we call earth "a mighty ball," did the Greeks style it a μέγας βούς (as implied by Hesiod when describing the incident at Mekone); and as we call mountains "the *bulwarks* of our globe," so did the ancients call them βούς or boves.

As additional evidence there may be cited οὔρος, "a bull;" the same word also means "a boundary, landmark; a watcher, bulwark; a fair wind." We also find οὐρός, "the serum or watery part of any substance; a waterway;" and finally ὄρος, "a mountain, a chain of hills." Now, different as their meanings be, there must evidently be a connection between all those, and it can only be found by going to the original οὔρος, and bearing in mind that the mountains are the bulls or guardians of our earth, the watchers on high that protect alike from the encroachments of aerial and subterranean influences; that they are also the boundaries and landmarks of continents, countries, and provinces; the breakers of gales and storm-winds, the condensers of watery vapour into clouds, and the great waterways or watersheds of continental areas, whence the rivers take their source and fertilise the plains while gliding down to ocean.

In the depths of ocean, then, restrained by earth and sea alike, as Horace tells us and as science teaches, were those mountain cattle and their three-headed owner. When he woke and raised his heads each geologic morning, the cattle left their stalls, one herd ranging westwards and two eastwards. They sought their feeding grounds on the heights above the waves, and there, dotted over the landscape, did they browse and chew the cud till evening came and the tremulous pipe of their master gave warning of the

night drawing on, and summoned each one back. And so they hied them home—a few strays now and then excepted—to their ocean barn, there to wait for the following day in order to return to the light above.

This is strictly in accordance with the established knowledge of to-day. All through Archaic, Palæozoic, and Mesozoic time, the Eastern Hemisphere had no land area sufficiently large to be deemed even approximately as a continent. Europe, Asia, and Africa were represented by a number of islands, crags, and ridges, scattered far and wide in a mighty ocean that made the Atlantic and Pacific one. Conditions somewhat similar prevailed in the Western half of our globe. The Archaic peaks and reefs, glutted with provender, had their day and sank below the waves, to rise again next morning branded with Silurian marks. Those, too, browsed upon the heights and slaked their thirst at the Silurian beach till evening came and sent them homewards. Another day dawned, and up came the Devon cattle to feast and fare in the old pastures and the new. And so on down through the ages till the close of the Cretaceous and the dawn of that long day, the Tertiary, when the herd of oxen left their stalls and forgot from that day to this to return home.

How this archipelagic condition of our globe prevailed during the interval between those periods is clearly shown by what follows, taken from the *Encyc. Brit.* The Cretaceous rocks “bring before us the records of a time when one continuous sea stretched over all the centre with most of the south of Europe, covered the north of Africa, and swept eastwards to the far east of Asia. There were doubtless many islands and ridges in this wide expanse of water, whereby its areas of deposit and biological provinces must have been more or less sharply defined. Some of these barriers can still be traced.’

In North America too, while there was more of a land area than in the case of Europe, a sea dotted here and there with islands and reefs still covered the long strip from New Jersey to the Gulf of Mexico, the entire

Mississippi valley to beyond the mouth of the Ohio, and extensive areas over the Rocky Mountain region, California, and Oregon. Similar conditions existed in the early part of the Tertiary period or Eocene, when, with the exception of some land in the northern parts of Russia, Scandinavia, and Britain, there existed, as Bonney tells us, "a sea which apparently covered parts of North Germany, Denmark, Belgium, Northern France, and south-eastern England. Beyond this, in the same direction lay land or a closely connected group of islands, and then came a sea which occupied the whole of South Europe, the present Mediterranean, far into Africa on the south, and eastwards right across Asia to join the Pacific Ocean. Here and there, however, it was interrupted by islands, now incorporated into the Alps, Carpathians, Pyrenees, and Apennines."

Compare this with the mythical description of Geryon, as told by Apollodorus :

δέκατον δὲ ἐπετάγη ἄθλον τὰς Γηρυόνου βοῦς ἐξ Ἑρυθρίας κομίζειν. Ἑρυθρία δὲ ἦν Ὠκεανοῦ πλησίον κειμένη νῆσος, ἣ νῦν Γάδειρα καλεῖται. ταύτην κατέκει Γηρυόνης Χρυσάορος καὶ Καλλιρρόης τῆς Ὠκεανοῦ, τριῶν ἔχων ἀνδρῶν συμφυῆς σῶμα, συνηγμένον μὲν εἰς ἓν κατὰ τὴν γαστέρα, ἐσχισμένον δὲ εἰς τρεῖς ἀπὸ λαγόνων τε καὶ μηρῶν. εἶχε δὲ φοινίκας βόας, ὧν ἦν βουκόλος Ἑυρυτίων, φύλαξ δὲ Ὀρθρος ὁ κύων δικέφαλος ἐξ Ἐχίδνης καὶ Τυφῶνος γεγεννημένος.—2. 5. 10.

To take up and carry off the oxen of Geryon from Erythia was assigned as the Tenth Labour. This Erythia, the deposited island of the ocean near, was that which is now called Gadeira. Here dwelt Geryon, the son of Chrysaor and of Callirrhoe, the daughter of Oceanus, who had the naturally compact frame of three individuals, contracted into one at the navel, but separated into three by both lagoons and ridges. And he had sandy oxen, of which Eurytion was herd, and the guardian was the two-headed dog Orthrus, the offspring of Typhaon and Echidna.

The only difference between the ancient and the modern account is that we put the summits of our continental areas in the foreground, and the foundations in the back ; Apollodorus, in consonance with his topic, makes use of a reverse procedure. "The Creator worked from the beginning after a plan in developing the continents on

the crust of the earth, and if we could go down into the depths of the ocean, and examine the irregularity of its floor, we should undoubtedly see the same thing there.”—*Hooker*.

Such then was “the grand terraqueous spectacle” at the opening of the Tertiary day,—one-embracing ocean, islanding a few plateaus and a thousand craggy peaks of mountains.

What was the spectacle at its close? Let us first view the character of the work performed during this long Tertiary day. Dana tells us: “There was, 1, the finishing of the rocky substratum of the continents; 2, the expansion of the continental areas to their full limits and their permanent recovery from the waters of the ocean; 3, the elevation of many of the great mountains of the globe, or considerable portions of them, through a large part of their height.”

All these were done; the Eocene sea had its bed elevated, the continental bounds were essentially completed, and the Rocky Mountains, Alps, Apennines, Pyrenees, Carpathians, Hindoo Koosh, Himalayas, and others were raised thousands of feet above their previous heights. “These vast corrugations of the earth’s crust were general over the whole globe about the same period.”

Yes; the Tenth task assigned had been successfully carried through; the cattle were “lifted,” taken up and carried off for good, and the corrugating or wrinkling force of earth, Geryon, had received its death-blow, for since that fateful day there has been no further mountain making, and those mountains successfully carried off have remained and still remain above, the back-bones as we dub them, the thigh-bones (*μηρῶν*) as Apollodorus styles them, of our mighty continents.

Hesiod gives the myth in its simplest form:—

Χρυσάωρ δ' ἔτεκε τρικέφαλον Γηρυονῆα
 μυχθεὶς Καλλιρόῃ κούρῃ κλυτοῦ Ὠκεανοῖο.
 τὸν μὲν ἄρ' ἐξενάρηξε βίῃ Ἡρακλεΐῃ
 βοῦσιν ἐπ' εἰλιπόδεσσι περιρρύτῳ εἰν Ἐρυθρίῃ,

- 5 ἤματι τῷ ὅτε περ βοῦς ἤλασεν εὐρυμετώπους
 Τίρυνθ' εἰς ἱεράν, διαβὰς πόρον Ὀκεανοῖο,
 Ὅρθον τε κτείνας καὶ Βουκόλον Εὐρυτίωνα
 σταθμῷ ἐν ἡερόεντι πέρην κλυτοῦ Ὀκεανοῖο.—Theog. 287.

United with Callirrhoë, the child
 Of Oceanus famed, Chrysaor bore
 Three-headed Geryon. Herculean strength
 Destroyed him for the crumple-footed kine
 In sea-girt Erythia, on that day
 When having passed through ocean's path and slain,
 In their dark lair afar from ocean loud,
 The herd Eurytion and Orthos, he
 To sacred Tiryns drove those broad-browed kine.

NOTES.

- 4 εἰλιπόδεσσι.—εἶλω πούς, “compressed as to the feet or base.” It is universally conceded, since Sir James Hall's experiment, that the flexures in rocky strata were produced by lateral pressure from below.
- Ἐρυθείη.—ἐρύω, “to draw away, guard, conceal.” Each formation has been elevated, and then submerged or *drawn away* to the bottom of the ocean. While submerged it was covered with the sedimentary deposits of its own denuded matter precipitated from the ocean above. It is this congeries of deposited matter at the bottom of the sea that is called “the sea-girt Erythia.” Apollodorus makes it still plainer, for, as already seen, he calls Erythia “the deposited island of the ocean near, that which is now called Gadeira,” or (γῇ δέρας) “the crust of earth.” If an island is that which is surrounded by water, then in very truth would Erythia be one.
- 5 ἤματι τῷ.—The Tertiary.
- 6 Τίρυνθ'.—Τίρυνς by metathesis and transposition becomes σύντρι (σύν τρία) “the three together,” that is Europe, Asia, and Africa. We read of a Tiryns previous to this, but it was only in posse: not till the three were joined as one above, in the Tertiary period presumably, would it be called ἱερά Tiryns.
- 7 Ὅρθον καὶ Εὐρυτίωνα.—The first of these refers to the force which produces a *jointed* structure in all our rocks, but especially in the granite. Those joints run straight up and down (ὀρθός); and as they commonly consist of *two sets* of joints, one running at right angles or nearly so to the other, and are especially marked in the *granite*, we find this Orthos called *two-headed*, and the offspring of *Echidna*.

In the same way does Eurytion mean (εὐρύς ῥύω) “the wide wrinkles, curvatures, or flexures” into which the rocky strata

were originally thrown. The connection between Orthos and Eurytion, or Strike and Curvature, is noticed in our works on Geology. This, by the way, establishes the derivation of *βουκόλος* from *βοῦς κόλος*, since it was only by *shortening* the horizontal extent of the *mountains* that the flexures could be produced; and hence the use of the epithet by Hesiod in order to show the agency that operated.

There is no need of pursuing the myth further. It only remains to point out that the same agency, "great earth movements," which geology ascribes as the cause of the upheaval of mountains and continents, is identical with "the Herculean strength" mentioned by Hesiod. The context proves it. The derivation proves it. *Ἥρα* (or Juno), as will be shown later on, is the personification of "dry land," and *Ἡρακλῆς* is therefore (*ἡῖρα κέλης*) "the movement of the land." The famous "Twelve Labours" prove it also, since they will be found to correspond with the strata comprised in our Geological Periods, that is to say, they represent the achievements of those "land movements" whereby the land was periodically elevated and submerged, and time divided geologically into the Archæan, Silurian, Devonian, and other eras. The solution of those Labours, when rightly unravelled, must consequently prove useful and interesting in the highest degree, as tending to throw light upon our own theories as regards the lithological structure of our globe in past ages, its fauna and flora, its geographical extent, and the coming of man. The Tenth Labour, this of Geryon, is evidently synchronous with the Tertiary period, and, when pursued further than we have gone, affords much food for reflection as to whether the three heads of Geryon were—not Europe, Asia, and Africa, but—Europe and Asia, Africa, and America. The knowledge of a far distant continent must have permeated historic times. Not to mention Plato's Atlantis, and allusions by some other prose writers, there are many passages in the poets which lend additional weight to the opinion that this "pastor Iberus" was really and truly the Iberian shepherd, "the Western ploughman" who wrinkled

up the Laurentian Hills before an Alpine, Caucasian, or other ox was turned loose in the Eastern Hemisphere. For those who may take up the elucidation of the Twelve Labours, this Tenth one, as being the Tertiary period, would be a vantage point from which to start in proceeding regularly backwards and forwards.

CHAPTER XIV.

THE ROCK OF AGES.

Echidna.—We open a book of stories from which some of the leaves have been torn here and there, so as to leave blanks at the beginning, middle, or end of each or some of the tales. We read, we note the gaps, can distinguish one narrative from the other despite those gaps, and endeavour to supply the omissions from what precedes or follows, as the case may be. And so we continue till we come to “finis,” and are satisfied ; even if the last page be torn out or pasted to the cover, we reason from experience as to how the story ended.

So is it with the crust of earth. Full of leaves, and with many breaks, we can trace each and every story pretty clearly notwithstanding. We can piece the Eocene pages from the Miocene, the Jurassic from the Cretaceous, and are never in doubt as to whether we are reading the Cainozoic or Mesozoic narrative. And so we turn leaf after leaf of the rocky volume till we come to the granite ; and if that leaf be lost or pasted to the cover, we believe it to have been there, or to be there if only we could go further. In either case we close the book. There is no more to be read, for experience has taught us so far that the granite is “the end,” and that below this granite we have never got. Whether it be the offspring of and rest upon the primal crust all round the globe, or whether it has incorporated its progenitor into its own being, or whether it be but an intruder from the fiery depths that has reared its massive front regularly or irregularly above the primeval crust, or whether even it be any two or all three of these combined, we know not, and probably never will know, for the reasons already mentioned.

Our rocks are igneous or aqueous as to their origin. Lava and other volcanic products are a type of the first; ordinary fossiliferous and metamorphic (presumably but an altered sedimentary) are types of the second. The granite remains, and some diversity of opinion exists as to its source. Some, and by far the greater number of geologists, call it Plutonic, and claim it as of igneous origin; others maintain that it is an aqueous or sedimentary rock, the ingredients of which have but been transformed to a further extent than the gneiss and other schists.

The reasons adduced in each case it is unnecessary to mention. It is enough for our purpose to show that the genealogy of granite has been and is still contested, and that the same diversity of opinion is entertained with regard to the mythological Echidna. This is the more remarkable as she is the first person of the Theogony so far whose descent has been positively disputed. Hesiod must have favoured the aqueous origin of granite, since he makes Echidna the daughter of Chrysaor and Callirrhœ.

Apollodorus—usually a conservative writer and one who, when in doubt himself, quotes Hesiod, Homer, the tragedians, &c.—ignores all authorities in this instance, and calls Echidna the daughter of Tartarus and Gæa, thus ranging himself as an advocate for her igneous birth. Still other writers style her the offspring of Peiras and Styx, by which is meant the formation of granite in all ages of the world, the oldest and the latest, for Peiras is the extreme (*πεῖρας*) or centre of the earth in one direction, and Styx, the invisible but actual boundary line between life and death, one inch or less below the surface, is the other extreme.

But, if her ancestry had never been mentioned, if there had been no marked disagreement on this point, and if even there was never a word of description regarding her, the very name, Echidna, would mark her as the granite. One of the most visible and distinguishing characteristics of the rock is its intrusive nature, as best exemplified in the numerous ramifying veins which it sends forth.

“No rock,” says one writer, “exhibits so admirably as granite the varieties assumed by veins.” Lyell too : “As a general rule, however, granite veins in all quarters of the globe are more sinuous in their course than those of trap.” The truth of these remarks is easily evidenced by the plates and illustrations in every text book on geology. Swelling out from the parent mass appear branches, varying in breadth from yards and feet, which pierce and traverse the adjacent and overlying rocks—even their own granitic predecessors—in every direction, till they become mere filaments at the end ; they cross and twine and curl and writhe—so much so and so strikingly that no other possible remark than “snaky-looking” can fall from the lips of the observer, whether he views the sketch or the rocks from which the sketch is taken. Put those expressive words into Greek and we have *Ἐχιδνα* (*ἔχῃς εἰδέναι*) “the snaky-looking one.”

Description, however, is not wanting. Here is Hesiod's, every line so bristling with characteristics of the granite as to make the blood run riot in the veins of a geologist :

- Ἥ δ' ἔτεκ' ἄλλο πέλωρον, ἀμήχανον, οὐδὲ ἑοικὸς
 θνητοῖς ἀνθρώποις οὐδ' ἀθανάτοισι θεοῖσι,
 σπῆϊ ἐνὶ γλαφυρῷ, θείῃν κρατερὸσφρον' Ἐχιδναν,
 ἥμισυ μὲν νύμφην ἐλικώπιδα, καλλιπάρηον,
 5 ἥμισυ δ' αὖτε πέλωρον ὄφιν, δεινόν τε μέγαν τε,
 αἰόλον ὠμωστήν, ζαθέης ὑπὸ κεύθεσι γαίης.
 ἔνθα δέ οἱ σπέος ἐστὶ κάτω κοίλῃ ὑπὸ πέτρῃ
 τηλοῦ ἀπ' ἀθανάτων τε θεῶν θνητῶν τ' ἀνθρώπων
 ἔνθ' ἄρα οἱ δάσσαντο θεοὶ κλυτὰ δώματα ναίων.
 10 ἡ δ' ἔρυντ' εἰν Ἀρίμοισιν ὑπὸ χθόνα λυγρῇ Ἐχιδνα,
 ἀθάνατος νύμφη καὶ ἀγήραος ἥματα πάντα.—Theog. 295.

She bore another in a sculptured cave,
 Echidna, of a nature wondrous hard,
 Intrusive, shapeless, and adapted not
 For gods immortal or for mortal men ;
 Half nymph, of oval face and cheeks so fair ;
 Half sinuous snake, exceeding strange and strong,
 Its altered food incorporating raw
 Under the crannies of majestic earth.
 And there, aloof from gods and mortals both,
 Her cave's far down beneath the concave rock ;
 There, sooth to say, the gods immortal have
 Assigned for her as home those famed abodes.

And 'mongst the Arimi beneath the earth
Was she, forlorn Echidna, drawn, a nymph
Immortal, never-aging for all time.

NOTES.

- 1 'Η δ'.—Callirrhoë, daughter of Oceanus, and consort of Chrysaor.
πέλωρον, &c.—The first two lines contain three important characteristics of the granite: it is eruptive and intrusive (*πέλωρον*); it is shapeless or unstratified (*ἀμήχανον*); and it is incapable, in a sense, of supporting organic existence, or non-fossiliferous (*οὐδὲ ἐοικὸς θνητοῖς*, &c.).
- 3 σπηῖ γλαφυρῶ.—In the depths of the crust, hollowed out by a denuding or sculpturing process, was the granite produced.
“The granites have been formed at great depths in the earth, and have cooled and crystallised slowly under enormous pressure where the contained gases could not expand.”—*Lyell*.
θεῖην κρατερόφρον.—Another mark of the granite is its exceeding hardness and durability. Egyptian obelisks made from it are still intact after a lapse of 3,000 years. The Pyramids, though internally constructed of limestone, are coated externally with granite.
- 4 ἤμισυ νύμφην.—The granite is presented to our view in two forms, half mountainous, half sinuous. In the first case it appears as large eruptive bosses, of which *Lyell* remarks, “Granite often preserves a very uniform character throughout a wide range of territory, forming hills of a peculiar rounded form” (*ἐλικώπιδα*). *καλλιπάρηον* refers to the crystalline texture, and to the white, grey, or flesh-red colour of the rock.
- 5 ἤμισυ ὄφιν.—In the second case, it rises, as already remarked, from the central mass and penetrates other rocks in highly tortuous veins and ramifications that present a snaky appearance.
- 6 αἰόλον ὤμωστήν.—It scorches, reddens, fuses, transforms, and alters in every way the rocks which it penetrates; it changes shale to mica-schist, sandstone to quartz, and limestone to marble. “As Mr. Jukes has shown, the Silurian strata are underlaid by a vast mass of Cambrian rocks, all of which must have been invaded by the granite before it could have reached its present horizon. He infers that the granite must have slowly and irregularly eaten its way upward through the Silurian rocks, absorbing much of them into its own mass as it rose.”—*Encyc. Brit.*
- 7 The deep subterranean origin of granite is reiterated by the poet.
- 9 δάσσαντο θεοί.—The intellectual gods, the literati, or scientists of those days. The Latin poets often use “*superi*” and “*dii*” in a similar sense.
- 10 Ἀριμοισιν.—*αἰρόμαι*, “lifted, raised up.” The modern theory is

that while volcanic rocks have cooled and consolidated at and above the surface, the granite has consolidated at great depths beneath, and always under considerable pressure; and that such granite as is now visible is owing to denudation of those original rocks under which it consolidated. To these latter, then, is the term *Arimoi* applied, and it may be said in addition that granite occupies the central parts of many mountain chains all over the world, "forming a kind of core round which the gneisses, schists, and other crystalline rocks are arranged."

- 11 ἀγήραος ἡμᾶτα πάντα.—"We must conclude that granite does not belong exclusively to the earliest nor to any one geological period, but rather that it has been formed at various epochs, and may even be forming now."—*Encyc. Brit.*

Τῇ δὲ Τυφάονά φασι μίγήμεναι ἐν φιλότῳτι,
δεινὸν θ' ὑβριστὴν τ' ἄνεμον ἐλικώπιδι κούρη·
ἣ δ' ὑποκυσαμένη τέκετο κρατερόφρονα τέκνα.—*Theog.* 306.

With her, this maiden of the oval face,
Mingled in union was (the story goes),
Typhon, eruptive, overbearing, strange:
And she conceiving bore a stubborn brood.

- 2 ἄνεμον.—ἀνεμέω "to vomit up, to belch."

This brood, as *Hesiod* tells us, embraced *Orthos*, *Cerberus*, the *Lernæan Hydra*, the *Chimæra*, *Sphinx*, and the *Nemean Lion*. *Orthos* we have already met in connection with *Geryon*; *Cerberus* should be studied with the Greek *Hades*, as should the *Sphinx* with *Œdipus*, and the *Hydra* and *Lion* with the *Twelve Labours*. The *Chimæra* alone properly belongs to the scope of our work.

CHAPTER XV.

THE HEAT AND DARKNESS OF OTHER DAYS.

Chimæra.—In its very earliest existence our earth, as already noted, was a self-luminous orb like the sun, possessed of an immeasurable intensity of light and heat that tended to make all its particles expand and be driven to the periphery. Cooled in time by contact with outer space and thus rendered heavier, those peripheral particles would gravitate towards the centre, and the orb would contract as a whole and shrink in volume. And so in varying degree would it proceed till a crust was established on the molten surface. But all this while radiation was going on, of both light and heat while incandescence lasted, of heat alone after the reckless dissipation of the one had unwittingly killed the other and blinded Mother Earth for ever.

What the measure of the heat was when our globe was covered with its primal crust is a matter of conjecture. "The temperature," says Bonney, "at which the crust would begin to form would probably be something like 2000° F. . . . The crust would probably be formed in all cases at a temperature above that of 'white heat,' and it would change slowly down through the various grades of colour till the natural tint of the constituent rock was assumed. Yet even then water would not at first be able to rest upon it, but if by some chance the vapour in the atmosphere were locally condensed, the drops of boiling rain would be rejected hissing from the uncongenial surface."

As a consequence of this steam atmosphere, another factor, namely intense darkness, would be added to the heat. Winchell has already graphically alluded to it, but we quote again: "The clouds poured the ocean continually forth,

and the seething crust continually rejected the offering. The field between the cloud and the earth was one stupendous scene of ebullition. But the descent of rains and the ascent of vapours disturbed the electricities of the elements. In the midst of this cosmical contest between fire and water, the voices of heaven's artillery were heard. Lightnings darted through the Cimmerian gloom, and world-convulsing thunders echoed through the universe."

That this heat and this darkness characterised the climate of our globe for many a succeeding period is emphasised by Figuier when describing the climatic conditions of each. In the Silurian "the atmosphere was still dense, and a pale sun was seen, struggling to penetrate this atmosphere, and yielding but a dim and imperfect light." In the Devonian was "a semi-opaque atmosphere, and a light still pale." In the Carboniferous, "the attributes of the atmosphere were excessive heat, extreme humidity, and a soft light from the sun veiled by permanent fogs." And so on till we reach the Jurassic period, when "the progressive cooling of the globe would produce a perceptible diminution of the heat towards the northern regions, and there would be a brilliant light from the sun." If such conditions, then, prevailed more or less up to the close of Palæozoic time, how raging must we suppose the heat and how black the gloom in the early Archæan days when the granite and the granite-born rocks were without a rival? Any description that could be given pales in significance and vividness when contrasted with this of Hugh Miller: "Let us suppose that during the earlier part of this period of excessive heat the waters of the ocean had stood at the boiling point even at the surface, and much higher in the profounder depths; and farther, that the half-molten crust of the earth, stretched out over a molten abyss, was so thin that it could not support, save for a short time, after some convulsion, even a small island above the sea level. What, in such circumstances, would be the aspect of the scene, optically exhibited from some point in space elevated a few hundred yards over the sea? It would be simply a blank, in which the intensest

glow of fire would fail to be seen at a few yards' distance. An inconsiderable escape of steam from the safety-valve of a railway engine forms so thick a screen that, as it lingers for a moment, in the passing, opposite the carriage windows, the passengers fail to discern through it the landscape beyond. A continuous stratum of steam, then, that attained to the height of even our present atmosphere, would wrap up the earth in a darkness gross and palpable as that of Egypt of old—a darkness through which even a single ray of light would fail to penetrate. And beneath this thick canopy the unseen deep would literally “boil as a pot” wildly tempested below; while from time to time, more deeply seated, would upheave suddenly to the surface vast tracts of semi-molten rock, soon again to disappear, and from which waves of bulk enormous would roll outward, to meet in wild conflict with the giant waves of other convulsions, or to return to hiss and sputter against the intensely-heated and fast-foundering mass, whose violent upheaval had first elevated and sent them abroad.”

Now, it is this excessive heat and gross palpable darkness which stamped the Archæan and many subsequent days, that Mythology has personified as the Chimæra.

In the first place, she was born of Echidna and Typhaon: her ancestors evidently point to the early days of the newly formed crust when the scorching blasts of heat intense went up from the semi-molten granite. In the next place, every epithet and phrase applied to her breathe of fire, of raging heat,—*igneæ*, *ignifera*, *rabida*, *fera*, *monstrum flammivomum*, *Chimæra spiritus igneæ*, *flammis armata Chimæra*; some, also, of intense gloom,—*horrida*, *horrenda*.

But it is when we examine the name itself that the complete significance bursts forth, for *Χίμαρα* means literally (*καίω μαινώ*) “the heated and darkened;” and our language retains a relic of the dread monster in the word “cimmerian,” where, while obliterating the idea of heat, we have intensified that of darkness. “Cremation” is another relic, the ideal process being reversed. The “heated” characteristic is that which is principally alluded

to by the poets ; but the “darkened” or blinded is distinctly mentioned by Apollodorus when writing of the Chimæra :

ἦν γὰρ οὐ μόνον ἐνὶ ἀλλὰ πολλοῖς οὐκ εὐάλωτον.—2. 3. 1. 3.

“For she was all but well-blinded (εὖ ἀλασώ) in one respect, but in many others not so well ;” where he evidently means that while earth had lost altogether or nearly so the light of incandescence, she still had the inferior light proceeding from the heated granite and the eruptions of volcanoes.

With this dual idea of heat and darkness we can understand that comparison of the Chimæra given by Hesiod, and retained by succeeding writers. The heat would have its lair in the molten mass of our globe, coiled like a dragon, as it were, in the sinuous billows of the liquid fire below : the scorching blast, ravenous, as hot air always is, of the steamy moisture that could not saturate it to repletion, would rise, like a lion raging for its prey and enveloped with a mane of darkness, to the heights above : from the surface of the crust itself that was midway between the two, the heat which was fed from the furnace underneath would radiate, would, like a bounding goat, spring forth in all directions. This radiating surface would be the real, the true Chimæra, and Lucretius expressly says so :

Prima leo, postrema draco, media ipsa Chimæra.

De Rer. Nat. v. 903.

It was necessary for the welfare of our earth, and of those beings who inhabited and were to inhabit it, that many processes, such as denudation, deposition, silting, stratification, upheaval, and depression should occur as the ages winged their flight. But above all others it was absolutely essential that the conditions alluded to under the Chimæra should be destroyed—that the heat should be reduced and the darkness be dispelled. This done, all other operations would be facilitated.

While the external envelope of our orb continued all gaseous, or all igneous, or even while the ocean was universal, there could be no proper temperature for earth,

since the heat would radiate equally from all portions of the surface. But just as soon as the universality of the ocean was broken up by an archipelago of craggy isles of granite, there ensued as a consequence unequal heating of the surface, and as a further consequence there began that interchange of atmospheric currents evidenced on a small scale by our land and sea breezes, and on a larger scale by the trade winds—an interchange that must have increased more and more according as the earth cooled towards the poles, and as the power of the sun began to be felt through the pall of clouds.

Briefly stated, the law of temperature is based on the fact that cold air descends, and that hot air ascends and has a capacity for absorbing moisture. Since both heat and evaporation are at a maximum in the equatorial regions, and decrease steadily towards the poles, the first great effect of unequal heating is to produce over the equator an ascending current of hot air that, absorbing aqueous vapour as it rises, flows as an upper-current to the poles and necessitates an under-current from the poles to the equator. The colder regions are thus made warmer, the heated ones cooler, and a suitable temperature is acquired for our earth as a whole.

Now, this simple theory of modern science is identical with that brought forward by Mythology, for Bellerophon, as the name *Βελλεροφόντης* denotes, is (*βάλλω ῥοφάνω*) “the ascending and absorbing one” who, with the assistance of Pegasus or Evaporation, destroyed the Chimæra with his arrows from on high.

Hesiod tells the story in its simplest form :

ἡ δὲ Χίμαιραν ἔτικτε, πνέουσιν ἀμαιμάκετον πῦρ,
 δεινὴν τε μεγάλην τε, ποδώκεα τε κρατερὴν τε.
 τῆς δ' ἦν τρεῖς κεφαλαί· μία μὲν χαροποῖο λέοντος,
 ἡ δὲ χιμαίρης, ἡ δ' ὄφις, κρατεροῖο δράκοντος,
 πρόσθε λέων, ὅπιθεν δὲ δράκων, μέσση δὲ Χίμαιρα,
 δεινὸν ἀποπνείουσα πυρὸς μένος αἰθομένοιο.
 τὴν μὲν Πήγασος εἶλε καὶ ἑσθλὸς Βελλεροφόντης.—Theog. 319.

Chimæra too, breathing resistless fire,
 The feared and vast, the swift and strong, she bore.

Her heads were three : of ravenous lion one,
 Chimæra's own, and snake's of aspect grim ;
 The lion, fore ; the dragon, aft ; and placed
 Betwixt the two, Chimæra, breathing forth
 The fearful energy of blazing fire.
 But, ne'ertheless, she sank beneath the yoke
 Of Pegasus and rare Bellerophon.

The story has been amplified by other writers, and new characters introduced. They tell us how in the very earliest days a transferring process went on whereby the particles of matter were driven to the surface, and gravitated back again towards the centre : this process they called *Proetus* (προίημι "to drive forward, to abandon"). The clear external space immediately surrounding the surface they called *Lycia* (λευκός), and its ruler they named *Iobates* (οιοβάτης), "the lone dweller." They tell us also how from the friendly intimacy between the heated peripheral particles and the cold external space, the former obtained for itself a partner, what some would call a contracted filmy crust, *Sthenobæa* (στενός βοεία), and what others would term efflorescence, *Anteia* (ἄνθος). They further tell us how in the course of time the ascending current (Bellerophon) that had shattered its own constitution by reckless dissipation and had unwittingly destroyed the radiant light and existence of incandescence, its near relative (Bellerus), sought refuge and pristine vigour in the well-warmed courts of Proetus ; how, while recuperating, the too ardent film, forgetful of its spouse below, became enamoured of its glowing guest and made, film that she was, markedly semi-transparent advances to further intimacy on their part. But in vain, we are informed : the heated current was possessed of too chaste, too rarefied a nature for such communion, and fled from adulteration, leaving the film it made light of flushed with passion, quivering with rage, and framing what would impel its spouse to destroy their guest. What could this spouse do ? Scrupulous by nature, next to nothing in attainments, he was with all his power but the puppet of the stronger side, a very atomy of what he should be ; and so,—as Horace tells us—urged

by the misleading charges of the frail spouse that imposed upon him, he could not withstand the pressure brought to bear, and gave vent to a wrath which expelled the heat and proved detrimental to himself.

Ut Proetus mulier perfida credulum
Falsis impulerit criminibus nimis
Casto Bellerophonti
Maturare necem refert.— Odes iii. 7.

The Chimæra, without Homer's narrative, would be imperfectly described. We insert it here, hoping that the foregoing remarks may prove serviceable in reading between the poet's lines.

Glaucus, a white-livered descendant of a gassy stock, meets Diomed in the field of battle, and tells the tale.

- Ἔστι πόλις Ἐφύρη, μυχῶ Ἀργεος ἵπποβότοιο,
Ἐνθάδε Σίσυφος ἔσκειν, ὃ κέρδιστος γένετ' ἀνδρῶν,
Σίσυφος Αἰολίδης· ὃ δ' ἄρα Γλαῦκον τέκεθ' υἱόν·
Αὐτὰρ Γλαῦκος ἔτικτεν ἀμύμονα Βελλεροφόντην·
5 Τῷ δὲ θεοὶ κάλλος τε καὶ ἡνρορὴν ἐρατεινὴν
ᾠπασαν· αὐτὰρ οἱ Προῖτος κακὰ μήσατο θυμῷ.
Ὅς ῥ' ἐκ δήμου ἔλασσε, ἐπεὶ πολὺ φέρτερος ἦεν
Ἀργείων· Ζεὺς γάρ οἱ ὑπὸ σκῆπτρῳ ἐδάμασσε.
Τῷ δὲ γυνὴ Προΐτου ἐπεμήνατο, δι' Ἄντεια,
10 Κρυπταδίῃ φιλότῃ μιγήμεναι· ἀλλὰ τὸν οὔτι
Πεῖθ' ἀγαθὰ φρονέοντα δαΐφρονα Βελλεροφόντην.
Ἥ δὲ ψευσαμένη Προΐτον βασιλῆα προσηύδα·
Τεθναίης, ὦ Προῖτ', ἥ κάκτανε Βελλεροφόντην,
Ὅς μ' ἔθελε φιλότῃ μιγήμεναι οὐκ ἐθέλούσῃ.
15 Ὡς φάτο· τὸν δὲ ἄνακτα χόλος λάβεν, οἷον ἄκουσε.
Κτείνει μὲν ῥ' ἀλέεινε, σεβάσασατο γὰρ τόγε θυμῷ,
Πέμπε δὲ μιν Λυκίηνδε, πόρεν δ' ὄγε σήματα λυγρὰ
Γράψας ἐν πίνακι πτυκτῷ θυμοφθόρα πολλὰ,
Δεῖξαι δ' ἡνώγει ᾧ πενθερῷ, ὅφρ' ἀπόλοιτο.
20 Αὐτὰρ ὃ βῆ Λυκίηνδε θεῶν ὑπ' ἀμύμονι πομπῇ.
Ἄλλ' ὅτε δὴ Λυκίην ἴξε, Ξάνθον τε ῥέοντα,
Προφρονέως μιν τίεν ἄναξ Λυκίης εὐρείης·
Ἐννήμαρ ξείνισσε, καὶ ἑνέα βοῦς ἱερευσεν.
Ἄλλ' ὅτε δὴ δεκάτῃ ἐφάνη ροδοδάκτυλος Ἥως,
25 Καὶ τότε μιν ἐρέεινε, καὶ ἥτεε σῆμα ἰδέσθαι,
Ὅτι ῥά οἱ γαμβροῖο παρὰ Προΐτοιο φέροιτο.
Αὐτὰρ ἐπειδὴ σῆμα κακὸν παρεδέξατο γαμβροῦ,
Πρῶτον μὲν ῥα Χίμαιραν ἀμαιμακέτην ἐκέλευσε
Πεφνέμεν· ἥ δ' ἄρ' ἔην θείον γένος, οὐδ' ἀνθρώπων,

- 30 Πρόσθε λέων, ὕπιθεν δὲ δράκων, μέσση δὲ χίμαιρα,
 Δεινὸν ἀποπνείουσα πυρὸς μένος αἰθομένοιο.
 Καὶ τὴν μὲν κατέπεφνε, θεῶν τεράεσσι πιθήσας.—*Iliad*, vi. 152.

In some compartment of that massive pile
 Which feeds the fiery steeds, there is a state
 Called Ephyre, where Sisyphus abode,
 Of all most greedy, and Æolian sprung.
 He Glaucus bore; Glaucus, Bellerophon,
 The open-hearted, unto whom the gods
 For gifts gave radiance and a spirit fine.
 But badly for himself did Proetus plot,
 (When he of agents far more powerful was,
 For Zeus had brought all others 'neath his yoke,)
 Who from his broad domain expelled the youth.
 The spouse of Proetus, blest Antea, longed
 With him in secret intercourse to join;
 But no—not in the least does she persuade
 Him, the high-minded, rare Bellerophon.
 Specious she spoke the monarch Proetus then:
 "Let Proetus die, or slay Bellerophon
 Who wished me not for love inclined to join."
 Thus she; and hearing, rage possessed the king.
 To slay him, sooth to say, he scrupled much,
 For this inspired his inmost thoughts with fear;
 And so to Lycia he despatched him straight,
 And many sorry, deadly tokens gave
 That on a folded tablet he had marked,
 And bade him show them to his sire-in-law
 In order his destruction to insure.
 Yet ne'ertheless, to Lycia stretched beneath
 The open safeguard of the gods he went.
 But when to Lycia and the molten red
 He came at length, then spacious Lycia's king
 With outstretched hands did pay him all respect.
 Nine days he feasted him, nine oxen killed;
 But when at last the tenth bright morning dawned,
 Then questioned he and asked to see what sign
 From his near cousin, Proetus, might he bring.
 But when his cousin's baneful sign was shown,
 Then first indeed he charged him as a task
 To slay Chimæra, the resistless one.
 And she was of the race of gods, not men:
 A lion, fore; a dragon, aft; and placed
 Betwixt the two, Chimæra, breathing forth
 The fearful energy of blazing fire.
 Though such she was, she lost her life to him
 Brimmed to the heart with tokens of the gods.

NOTES.

- 1 ἔστι, &c.—We are transported in thought to a time when the molten mass began to feel the effects of cooling, to work more sluggishly as a whole—sufficiently so to make the surface assume a thickened, *pasty* (φυράω) consistency.

Argos, related by derivation to both ἔργον, “a work, that which is wrought or made,” and to ἀργός, “glistening; sluggish,” evidently refers to our globe as a whole in those days, just as ἑννόβωτος does to the eruptive lava, granite, &c., nourished within it.

If our earth, as claimed, is still molten in the interior, then there must be an Ephyre still in existence, where the molten lava is thickened in consistence through contact with the rocks or vesicular air within: for this reason, possibly, does Homer commence with “ἔστι.”

- 3 The genealogy of Bellerophon is best understood by noting the steam from the furnace or locomotive. The *ascent* (Bellerophon) must have been preceded by the *gray* colouring (Glaucus), and that by the *steam-process* or *ebullition* (Sisyphus). The same order of being may be said of Combustion.

4 ἀμύμονα.—α μύω, “not keeping close, open-hearted.”

- 8 Ζεὺς γὰρ οἱ.—The οἱ refers to Zeus himself. Life had established its sway over the surface; but the half-molten particles beneath the surface (Proetus) were still independent.

- 11 δαΐφρων.—Hesiod calls Bellerophon ἐσθλός, and Horace calls him nimis castus: they are both synonymous with Homer’s phrase δαΐφρων (δαίω φρήν), “kindled in spirit, or divided in spirit,” hence, *rare, rarefied*.

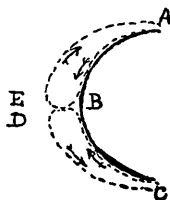
- 14 The specious pleading (ψευσσάμενη) comes in with the use of οὐκ, for the line will have very different meanings according as we refer οὐκ to the preceding *μυγήμεναι* or to the following *ἐθελοῦση*.

An attempt has been made to give the same ambiguity in the English rendering, and the reader may put a comma after *me*, or after *not*, according as he sympathises with Antea.

- 16 σεβάσασατο.—It proved a sorry day for himself, as the poet has already remarked, when Proetus expelled the heated air and drove it to the light of day, since he thus grew colder in his own nature and fell an easier prey to Perseus, as Ovid relates.

- 18 πίνακι πτυκτῶ.—The folded tablet is literally true, and can be readily understood from the following cut and remarks taken from Comstock’s Philosophy.

“Suppose ABC to represent a portion of the earth’s surface, A being towards the north pole, C towards the south pole,



and B the equator. The currents of air are supposed to pass in the direction of the arrows. The wind, therefore, from A to B, would blow on the surface of the earth, from north to south, while from E to A the upper current would pass from south to north, until it came to A, when it would change its direction towards the south. The currents in the southern hemisphere, being governed by the same laws, would assume similar directions."

The ascending current at the equator would be thus double-troughed or *folded*, and would contain some of the lateral cold air, enough to make the *σήματα λυγρὰ, θυμοφθόρα*.

- 20 The heated current ascends to the exterior surface (Lycia), which was still but *molten fire* (*Ξάνθον ῥέοντα*), and is eagerly received by exterior space.

- 23—24 The connection between the Twelve Labours of Hercules and our own great geological formations has been already pointed out, when treating of Geryon. When Homer says, "Nine days he feasted him, nine oxen killed," he means that for nine cycles, preceding the tenth, the great ox, Earth, passed through nine great mutations, each mutation a different ox as it were, during all of which the conditions embodied in the Chimæra prevailed more or less. On the morning of the tenth was Bellerophon commissioned to slay the Chimæra. What was this tenth day? Evidently, the Tertiary period, that has been shown to be synchronous with the Tenth Labour. According to Mythology, then, it was on the morning of the Tertiary period, in Eocene times, when the temperature of our earth began to be reduced so as to resemble somewhat that of to-day.

This is in perfect accordance with the conclusion arrived at by modern theories based on geological research.

The Cretaceous preceded the Eocene, and Figuier says of it, "The seasons are no longer marked by indications of central heat, and the influence of the light and heat of the sun began to be felt more strongly. Zones of latitude show signs of existence, and biological conditions are such as we can comprehend." "It is supposed," says Hooker, "that after the Cretaceous period was completed, in the movement which raised the mountains there was a general elevation of the land of the northern regions, and that the severe cold which was thus produced was at least a prominent agency in the destruction of life at this period."

- 32 *τεράεσσι πιθήσας*.—Saturated with evaporation,—mounted on Pegasus.

The tale has been amplified further in connection with Pegasus, but in the hope that the personified characters

are already sufficiently identified, there is no necessity for further elaboration. Let us conclude by saying that the Chimæra was destroyed, and that temperature and an orderly succession of the seasons were secured for earth; that Proetus rued the day when he drove the hot ascending current from his court, and thus permitted a solid crust of some fifty miles or more in depth to encroach on his domain; and that Bellerophon himself, the too rare Bellerophon of those older days, outlived his usefulness for good, grew hateful to the gods, and now wanders blind, solitary, and far from the trodden path of mankind, in the Aloeian fields where our miners start at his shadow and his breath as they go down, down into the bowels of the earth. We have still, it is true, an ascending current; but it is not that which in the days of old proceeded directly from the glowing orb itself—not the true *terrestrial* rider who ambitioned heaven, unconscious that his steed was recalcitrant, and oblivious of the fact that he still carried the *σήματα λυγρὰ, θυμοφθόρα*, in the shape of a sluggish side wind, or “*segni pede*,” as Horace puts it, Ode III. 12:

Eques ipso melior Bellerophonte, neque pugno
Neque segni pede victus.

Our earth has assuredly grown colder and colder, and is now at best but a storehouse for the sun. Bankruptcy has dogged her steps ever since she acquired the oxen of the Iberian ploughman, and to-day she is compelled to borrow heat from the same source from which she previously borrowed light.

CHAPTER XVI.

“HYDRA SÆVIOR INTUS HABET SEDEM.”

Ophis.—Of the children of Phorcys and Ceto, this character alone remains. All connected with it—genealogy, order of being, name, and description point to it as being the centre of our earth, personified.

Κητὸ δ' ὀπλότατον Φόρκυ φιλότῃτι μαιεῖσα
 γείνατο δεινὸν ὄφιν, ὃς ἐρεμνοῖς κεύθεσι γαίης
 πείρασιν ἐν μεγάλῃς παγχρύσεια μῆλα φυλάσσει.
 τοῦτο μὲν ἐκ Κητοῦς καὶ Φόρκυνος γένος ἐστί.—Theog. 333.
 In union mixed with Phorcys Ceto bore
 A serpent terrible, her youngest child,
 That in the closes, in the joyless depths
 Of mighty earth, guards the all-golden seeds.
 From Ceto and from Phorcys is this breed.

With the arrival of Echidna comes a pause in the Hesiodic narrative, the poet breaking off, as it were, in order to return to and dwell further on the Titans and their offspring. But we have read enough to put the question in all seriousness, “Is not Theogony Cosmogony? And is not its author’s theme ‘the building of our Earth?’” Step by step, without break or intermission, has the story progressed,—from the unknowable of matter and force to the knowable; from oneness to division; from the universe to earth: that earth is then taken up and traced from incandescence onwards: we are told how our orb was once a molten ball of fire; how a crust became established on it, and an ocean of waters on that crust; how those great natural phenomena, the rain, the clouds, the storm-winds, and the rainbow had their being; how the germs of our mountains and continents came into existence; how the granite basis of our globe was laid; and how evaporation and temperature were secured. If this be not world-building, then nothing is.

Ovid, in his 2nd *Fabula*, gives a running sketch of all the principal happenings from Pontus down. In his 1st *Fabula*, he brought the story from Chaos down to the Light and Universes. He then proceeds :

- Sic ubi dispositam quisquis fuit ille deorum,
 Congeriem secuit, sectamque in membra redegit.
 Principio terram, ne non æqualis ab omni
 Parte foret, magni speciem glomeravit in orbis.
- 5 Tum freta diffudit, rapidisque tumescere ventis
 Jussit et ambitæ circumdare litora terræ.
 Addidit et fontes et stagna immensa lacusque,
 Fluminaque obliquis cinxit declivia ripis,
 Quæ, diversa locis, partim sorbentur ab ipsa,
- 10 In mare perveniunt partim, campoque recepta
 Liberioris aquæ pro ripis litora pulsan.
 Jussit et extendi campos, subsidere valles,
 Fronde tegi silvas, lapidosos surgere montes.
 Utque duæ dextra cælum totidemque sinistra
- 15 Parte secant zonæ, quinta est ardentior illis :
 Sic onus inclusum numero distinxit eodem
 Cura dei, totidemque plagæ tellure premuntur.
 Quarum quæ media est, non est habitabilis æstu :
 Nix tegit alta duas : totidem inter utramque locavit,
- 20 Temperiemque dedit mixta cum frigore flamma.
 Imminet his aer, qui, quanto est pondere terræ
 Pondus aquæ levius, tanto est onerosior igni.
 Illic et nebulas, illic consistere nubes
 Jussit, et humanas motura tonitrua mentes,
- 25 Et cum fulminibus facientes frigora ventos.
 His quoque non passim mundi fabricator habendum
 Aera permisit. Vix nunc obsistitur illis,
 Cum sua quisque regant diverso flamina tractu,
 Quin lanient mundum, tanta est discordia fratrum.
- 30 Eurys ad Auroram Nabatæaque regna recessit
 Persidaque et radiis juga subdita matutinis.
 Vesper et occiduo quæ litora sole tepescunt,
 Proxima sunt Zephyro : Scythiam septemque trionem
 Horrifer invasit Boreas. Contraria tellus
- 35 Nubibus assiduis pluvioque madescit ab Austro.
 Hæc super imposuit liquidum et gravitate carentem
 Aethera, nec quicquam terrenæ fæcis habentem.
 Vix ita limitibus dissæpserat omnia certis,
 Cum quæ pressa diu massa latuere sub illa,
 Sidera cœperunt toto effervescere cœlo.

The mass when thus disposed some god soe'er
Cut, and when cut reduced it into parts.
And first of all the earth, that it might be
In all directions equal, did he round
After the fashion of a mighty orb.
Then poured he forth the seas, and these he bade
To heave and swell with winds of boist'rous sweep,
And clasp the shores of earth environed round.
Springs, too, he added, vast lagoons, and lakes,
And girt with winding banks the rushing streams
Which, scattered wide, are some by earth absorbed,
Some reach the sea and beat for banks the coasts,
When gathered in the freer tide's expanse.
Ordered he, too, the plains to be outstretched,
The vales to sink, the woods to be enwrapped
With foliage, the stony hills to rise.
As circles two, on right, on left, divide
The vault above—hotter than these the fifth—
E'en so the god's solicitude defined
With number congruous the charge consigned,
And same for clime are stamped upon the earth.
Of these unfit for life through heat is that
Which midmost is ; snow covers deep two more ;
Twixt each of those a like amount he placed
And tempered them, the heat being mixed with cold.
O'er these hangs air, which heavier is than fire
As water's weight is lighter than the earth's :
And there he bade abide the fogs, the clouds,
The thunderclaps that awe the minds of men,
And cold-producing winds with lightning's bolts.
But yet no leave to rule the air at large
To those was granted by the demiurge :
With difficulty now, when each its own
Peculiar blasts in varied clime controls,
Is curb put to them so they may not rend
The world's domain : so great is strife of kin.
To eastern tracts and Nabatean realms,
Persia, and peaks touched with the morning's rays,
Did Eurus go : for Zephyrus are next
The west and shores by setting sun made mild :
Rude Boreas seized on Scythia and the north :
By Auster is the opposite extreme
Of earth made moist with constant clouds and rain.
O'er these the ether, liquid, free from weight,
And having nought of earthly dross, he placed.
Scarce had he thus with fixed bounds hedged all,
When stars, that long lay pressed beneath the mass,
Began to shed their light in heaven's expanse.

NOTES.

- 1—2 In the preceding fable he described the division into universes. He now deals with our particular universe (*congeries*), and in two brief lines tells how it, too, was disrupted by some force not well recognised, and reduced to the various heavenly bodies comprised within it.
- 3 principio.—He begins with that particular portion (*membram*) of the universe, our earth.
- 17 totidem.—“As many circles (*zonæ*)”—that is five, the equatorial circle, the two tropics, and the two polar circles—“are stamped upon our earth to mark its climate.”
- 18 quæ media.—The equatorial circle; for places *directly on the equator* suffer excessively, as a rule, from the intense heat.
- 19 duas.—*Zonas* is understood, the Arctic and Antarctic *Circles*.
totidem inter, &c.—Between the equator and each polar circle (inter utramque) was placed the *same number* (totidem) of *degrees* or *parallels of latitude*, thus constituting the two temperate and the two torrid zones; so that all the earth between the polar circles is really what is meant by the poet as having temperature.

It only remains to say a few words with regard to the Scriptural narrative. Genesis has condensed it to the extreme of simplicity in I. 9, where all minor additions and subtractions are ignored, and only the grand total mentioned:

“And God said, Let the waters under the heaven be gathered together unto one place, and let the dry land appear: and it was so.”

But here and there throughout the Scriptures we come across allusions and phrases that are startling in their nature. Most of them, it is true, are interrogational; but even so, they tend to prove that the construction of the heavens and the building of our earth were topics that occupied, deeply occupied, the minds of those who penned the words. “Dost thou know the balancings of the clouds?” asks Elihu of Job, and the question remains question still.

It would be fatuous to deny, after reading portions of Job, the Proverbs, and the Psalms, that an intelligence had applied its heart to wisdom, burnt the midnight oil, and probed knowledge to its depths, only at last to say

submissively with Ecclesiastes, "Then I beheld all the work of God, that a man cannot find out the work that is done under the sun: because though a man labour to seek it out, yet he shall not find it; yea, further; though a wise man think to know it, yet shall he not be able to find it."

BOOK FIFTH.

TITANIC TIES.

CHAPTER I.

THEOGONY.

TITANS.	Oceanus, md. Tethys	Potamoi	Anemoi	{ Zelos Nike Cratos Bia
		Oceanides		
	Hyperion, md. Thia	Helios	Astra	
		Selene		
	Crius, md. Eurybia	Eös	Styx . .	
		Astræus		
		Pallas, md.	Hecate	
		Perseus		
	Cœus, md. Phœbe	Asterie		
		Latona		
	Kronos, md. Rhea	Vesta		
		Demeter		
		Juno		
		Pluto		
		Neptune		
Jupiter				
Iapetus, md. Clymene	Atlas			
	Mencetius			
	Prometheus			
	Epimetheus			

MYTHS.

Oceanus.—Son of Uranus and Ge, and married to his sister Tethys, by whom he begot all the river gods or Potami, and over 3,000 water nymphs or Oceanides. The Orphic hymns call him the son of Cœlus and Vesta; Homer styles him the father of all the gods; and the ancients in general regarded him as the father not only of the rivers, but of all animals and of the gods themselves. Apollodorus says that he alone of all the Titans did not enter into the conspiracy against his

father, Uranus. He is represented as an old man, with long flowing beard, sitting upon the waves of the sea, and as honoured with frequent visits from the other deities. The early Greeks regarded Earth as encompassed by a river perpetually flowing round it, which they called Oceanus, and from which was derived the source of all the rivers and other waters of our globe. Out of and into this river the sun and stars were supposed to rise and set, and on its banks were the abodes of the dead. From its thus being the earth's outer covering, the name came later on to be used for the great *outer* waters of earth, and particularly the Atlantic, as distinguished from the *inner* waters, or Mediterranean.

Tethys.—Daughter of Uranus and Gē, wife of Oceanus, and mother of the Potami and Oceanides.

Potamoi.—Rivers, such as Nile, Alpheus, Eridanus, and others.

Oceanides.—Nymphs, daughters of Oceanus and Tethys, over 3,000 in number, the most famous of whom were Electra, Doris, Clymene, Callirrhœe, Dione, Metis, Asia, Calypso, and Styx. They were honoured with libations and sacrifices, and their favour was invoked by sailors as a protection against storms and the dangers of the deep.

Hyperion.—A Titan, married to his sister Thia, and father of Helios, Selene, and Eōs.

Thia.—Daughter of Uranus and Gē, and wife of Hyperion. In the Homeric hymn she is called Euryphæssa.

Helios.—The Latin Sol, our own Sun, described as the god who sees and hears everything, and who gives light to gods and men. He rises from Oceanus in the east, traverses heaven in a chariot drawn by four fiery steeds, and descends in the evening into the darkness of the west and Oceanus. Later writers, in describing his return passage from west to east, picture him when sailing on his nightly voyage either as slumbering in a golden bed or as carried in a golden boat, the work of Vulcan.

Selene.—The Luna of the Latins, our own Moon, daughter of Hyperion and Thia ; or, according to later writers, of Zeus and Latona, or of Pallas. She is pictured with long wings and a golden diadem or crescent, is clothed in a flowing robe, and traverses the heavens in a chariot drawn by two milk-white steeds.

Eōs.—The Latin Aurora, and goddess of the dawn. Carried in a rose-coloured chariot by two horses, Lampus and Phaethon, she opens the gates of the east, announces the coming of the Sun, pours dew upon the earth, and chases Somnus, Nox, and the stars from heaven. By Astræus, the son of Crius and Eurybia, she begot the Winds and Stars. She loved Tithonus and obtained immortality for him, but not eternal youth ; as a consequence, he grew old and shrunken, and was finally changed to a grasshopper.

Crius.—A Titan, married to Eurybia, by whom he begot Astræus, Pallas, and Perses.

Eurybia.—Daughter of Pontus and Gē, and wife of Crius.

Astræus.—Married to Eōs, by whom he begot the Winds and the Stars.

Pallas and Styx.—Married to Styx, by whom he begot Zelus, Nike, Cratos, and Bia. Styx, the daughter of Oceanus and Tethys, was the first of all the older immortals who, with her children, assisted Zeus against the Titans. In return for such services, her children were allowed to dwell near Zeus in Olympus, and Styx herself was made the solemn oath of the gods, a violation of which entailed a deprivation of divinity and of the use of nectar and ambrosia for the space of 100 years, more or less, according to different accounts. As a river, Styx is described as a branch of Oceanus, proceeding from its tenth source, flowing seven times round the nether world, and dwelling at the entrance to Hades in a lofty grotto supported by silver pillars.

Perses.—Brother of Astræus and Pallas, and married to Asterie, by whom he begot Hecate.

Cœus.—A Titan, married to his sister Phœbe, and by her the father of Asteria and Latona.

Phœbe.—Sister and wife of Cœus, mother of Leto and Asterie.

Leto.—The Latona of the Latins, daughter of Cœus and Phœbe, and sister of Asterie. She was beloved by Zeus, having been wed to him before Juno according to some accounts, while others say that she was but one of his favourites. During her pregnancy she was persecuted by the jealous Juno, and all the world was consequently afraid to give her refuge. She wandered about till finally she came to Delos, which was then a floating island and bore the name of Asterie or Ortygia. Zeus fastened it with adamantine chains to the bottom of the sea so as to be a secure resting place for Latona, and here after nine days' labour were her children born, first Diana, and then Apollo.

Asterie.—The sister of Latona. To escape from the advances of Zeus, she was changed to a quail and threw herself into the sea. There she was metamorphosed into a rock that lay for a long time under the surface of the waters, over which it subsequently rose and was called Asterie ("the island that had fallen from heaven like a star") after her name. It was subsequently called Delos, and this island it was that received Latona in her confinement.

Asterie became the wife of Perses, son of Crius and Eurybia, and by him she begot Hecate.

Hecate.—This Hecate is described as having power in heaven, earth, and sea. Jupiter not only permitted her to retain all the honours she possessed under the Titan rule, but even added to them himself, especially by making her the guardian of

the young. She bestows honour and happiness on those she favours ; she helps in council, war, the courts of justice, and in public games ; she aids hunters and sailors, assists in caring for the flocks, and in nourishing the young. Much has been added by later writers. She has been made a deity of the lower world, and a very powerful one ; described as dwelling at places where two roads crossed ; in cemeteries, and near the blood of murdered persons ; as wandering about with the souls of the dead, teaching sorcery and witchcraft, and as sending forth at night spectres and phantoms to frighten mortals. Her approach is announced by the whining and howling of dogs. She has often been confounded with other divinities, such as Luna in heaven, Diana on earth, and Proserpine in the lower world, and has thus been called *Tergemina*, *Triformis*, *Triceps*. She is variously pictured as having three bodies or three heads, that of a horse on the right, a dog on the left, and in the middle that of a lion, a woman, the moon, or a sow, for authors differ considerably on the point.

CHAPTER II.

OCEANUS, THE TIE OF WATERS.

HAVING in the early part of his Theogony alluded to the Titans as "matter endowed with magnitude," Hesiod now takes up each individual Titan and descants upon him and upon those sprung from him. This he does in regular order, commencing with Oceanus, but leaving Iapetus to be described the last.

Oceanus.—Whence came our oceans, seas, rivers, springs, and every source of water upon our globe? In the nebulous period all things were as one, whether of matter or force. As evolution proceeded, the forces grew separate into physical and chemical, while the nebulous atoms of matter assumed to themselves dimensions, with the combined result of a firmament being evolved as a boundary for our Universe. There would thus, as already mentioned, be eventuated a midway region between this firmament and a constantly active and contracting mass whose density must ever increase towards the centre previous to the throwing off of further portions of its being, and must probably vary towards the surface from the heat evolved in its jaculatory efforts. In the midway region alluded to would be assembled the vapour of every element that is volatile at a high temperature, and chief among them the elements of which water is composed. "When the earth was incandescent," says Gunning, "the oceans were *above* not *on* the earth: the waters were here from 'the beginning,' here in their elemental gases. As silica is the oxide of silicon, water is the oxide of hydrogen: both imply a time when their elements had not combined, were free." "When the earth and its atmosphere," resumes the same writer, "had cooled to the dew point, condensation occurred:

oxidation must have occurred *before condensation*: the oceans must have hung as a pavilion of clouds and a thick veil of mist before they fell in rain upon the earth."

The nebulous atoms had thus changed in time into elements, and some of those elements had later on combined to form what we call *Aqueous Vapour*: in other words, the nebulous atoms of Gē had become endowed with magnitude, and one particular class of those combined atoms formed what Mythology has called *Oceanus*.

Let us study in condensed form this aqueous vapour :

1. It, or its elements, are of hoary antiquity, since, as being the most volatile, it would be among the first to be evolved from the heated mass.
2. Being the immediate source of rain, and rain of springs, and those springs of rivers,—then every stream and river may well be said to have their origin in this aqueous vapour.
3. Until it condensed to form the first rain that fell, there could be no life, vegetable or animal, upon earth.

Now, wherein does this condensed science differ from Mythology when it tells us that Oceanus was one of the oldest deities; the father of mighty rivers and gladsome streams; the father of the Gods themselves? And wherein does Science or Mythology differ materially from the following passages in Genesis, Chap. II., 5 and 6.

5. And every plant of the field before it was in the earth, and every herb of the field before it grew: for the Lord God had not caused it to rain upon the earth, and there was not a man to till the ground.
6. But there went up a mist from the earth, and watered the whole face of the ground.

Τηθύς δ' Ὀκεανῷ Ποταμοὺς τέκε δινήεντας.—Theog. 337.

For Oceanus Tethys then begot
The eddying rivers,

both the Nile, and Alpheus, and wide-wandering Eridanus, and so on for those rivers δινήεντας, that is, the rivers that flow in an eddying or *circular* course, from the aqueous

vapour above to sea beneath, and back again to whence they came, and so on interminably.

Once more referring to what is stated in our modern works as regarding the nature of this aqueous vapour, we find the following among others :

1. It is a bland, impalpable gas, which the atmosphere in combination with the waters of the sea is constantly secreting.
2. By absorbing the radiated heat, it acts as a mantle to earth in securing it against cold ; and it is an important factor in the meteorological phenomena of our globe.
3. Beneath its benign shelter live mankind, animals, and plants. "Eliminate the aqueous vapour for the short interval of a summer night," says a writer on geology, "and the sun would rise next morning on an earth petrified with frost."
4. It is ever in motion, forms a connecting link between heaven and earth, and according to its density or rarity are hearing, sight, and motion affected. It is the presence of aqueous vapour that affects the density of the air, and the denser the air the better is sound heard, the more resistance is there to motion, and the more interference with vision, as instanced well on a foggy day.
5. Being the source of rain and moisture, it is all-conducive to the fertility of the land, the growth of vegetation, and the welfare of cattle.
6. It is always, even on the hottest day, present in the atmosphere, is potent in the rarefaction or density of the air, and must consequently by the production of rain, hail, and snow, be considered as an active agent in the corrosion and disintegration of the rocks.

The following is Hesiod's description of the daughters of Oceanus, the Oceanides. Close examination will show that it is no mere jumble of names ; that, on the contrary, it is a well digested summary of the attributes which modern science assigns to aqueous vapour :

- Τίκτε δὲ θυγατέρων ἱερὸν γένος, αἱ κατὰ γαίαν
 ἄνδρας κουρίζουσι σὺν Ἀπόλλωνι ἄνακτι
 καὶ Ποταμοῖς, ταύτην δὲ Διὸς πάρα μοῖραν ἔχουσι,
 Πειθῷ τ' Ἀδμήτῃ τε Ἰάνθῃ τ' Ἠλέκτρῃ τε,
 5 Δωρίς τε Πρυμνῷ τε καὶ Οὐρανίῃ θεοειδῆς,
 Ἰππῷ τε Κλυμένῃ τε Ῥόδειά τε Καλλιρρόῃ τε
 Ζευξῷ τε Κλυτίῃ τε Ἰδυῖά τε Πασιθόῃ τε
 Πληξαύρῃ τε Γαλαξαύρῃ τ' ἑρατῇ τε Διώνῃ
 Μηλόβοσσις τε Θόῃ τε καὶ εὐειδῆς Πολυδῶρῃ,
 10 Κερκῆϊς τε, φυὴν ἑρατῇ, Πλουτῷ τε βοῶπις,
 Περσηΐς τ' Ἰάνειρά τ' Ἀκάστη τε Ξάνθῃ τε,
 Πετραίῃ τ' ἐρόεσσα Μενεσθῷ τ' Εὐρώπῃ τε,
 Μῆτις τ' Εὐρυνόμῃ τε Τελεστώ τε κροκόπεπλος
 Χρυσῆϊς τ' Ἀσίῃ τε καὶ ἱμερόεσσα Καλυψώ,
 15 Εὐδῶρῃ τε Τύχῃ τε καὶ Ἀμφιρῷ Ὠκυρόῃ τε,
 καὶ Στύξ, ἥ δὴ σφειων προφερεστέρα ἐστὶν ἀπασέων.
 αὗται δ' Ὠκεανοῦ καὶ Τηθύος ἐξεγένοντο
 πρεσβύταται κοῦραι· πολλοὶ γὰρ μὲν εἰσι καὶ ἄλλαι.
 20 αἱ ῥα πολυσπερές γαίαν καὶ βένθεα λίμνης
 πάντα ὁμῶς ἐφέπουσι, θεάων ἀγλαὰ τέκνα.
 τόσσοι δ' αὖθ' ἕτεροι ποταμοὶ καναχιδὰ ῥέοντες,
 υἱέες Ὠκεανοῦ τοὺς γείνατο πότνια Τηθύς·
 τῶν ὄνομ' ἀργαλέον πάντων βροτῷ ἀνδρὶ ἐνισπείν,
 25 οἱ δὲ ἕκαστοι ἴσασιν, ὅσοι περιναιετάουσι.—Theog. 346.

A blessed race of daughters she begot,
 Who with the rivers and Apollo king
 Mortals caress,—from Jove this lot they have :
 The bland and impalpable, warm, electric,
 The blessing, and anthem proemial, divine,
 The restless, pervading, the flowing, and changing,
 Help to life, hearing, vision, to motion diffused,
 The moistening, fertile, sweet heavenly treasure,
 All-nutrient, cursive, and well-favoured fount,
 The beauteous-shaped circlet, the wealthy for oxen,
 Dispelling, cloud-melting, condensing, and gilding,
 The daintily crumbling, corrosive, and mould'ring,
 The subtle in nature, the boundless, mysterious,
 The pale-golden, teeming, desire-breeding mantle,
 The kind, the auspicious, circumfluous, swift,
 And Styx which indeed of them all is the first.

Of Oceanus and of Tethys then
 These maids, the oldest of their kind, were sprung ;
 Yet many others too there are besides.
 For thousands three these tiny hammerers are,
 These ocean-born, who everywhere alike

Roam scattered o'er the earth and depths of sea,
 A glorious race of goddesses divine.
 And rivers just as many are there, sons
 Of Oceanus, dashing on their course,—
 These too the venerable Tethys bore,—
 Whose names in full 'twere hard for man to tell,
 But known they are to those who near them dwell.

NOTES.

2—3 The aqueous vapour, light and heat, and size of rivers, have much to do with the civilisation of mankind.

4 Ἀδμήτη, ἄδμητος, “unconquered, *untouched*, impalpable.”

5 Πρῶτον, πρὸ ὕμνος “the first hymn,” the poem of creation.

“Before eternal Love had lit the sun,
 Or Time had traced his dial-plate in stars,
 The joyful anthem of the ocean flowed.”—Mrs. Hale.

6 Κλυμένη—κλύω μένος “force or strength perceived, or viewed in all its aspects,” hence, “renowned, pervading.”

8 Πληξαύρη, πλῆθος ξηρός “filling the dry;” Γαλαξαύρη, γάλα ξηρός “making the dry flow with milk;” Διὸν δῖος ὠνή “a heavenly purchase.”

9 Πολυδῶρη, πολὺς δῶρον, or πολὺς ὕδωρ.

11 Ἰάνειρά, λαίω εἶρος “to melt the fleece;” Ἀκάστη, α χαστός “not opened”; hence, close, *dense*; Ξάνθη, ξανθός, “yellow, red,” referring to the varying *colour* of the clouds.

12 Πετραίη, πέτρα ραίω “to break the rocks;” Μενεσθῶ, μένος ἐσθίω “to eat the strength;” Εὐρώπη, εὐρώς “mould, decay.”

14 Ἀσίη, ἄω “to satiate.”

ἱμερόεσσα Καλυψώ

“With the fertile moisture cheered,
 The orchards smile, joyous the farmers see
 Their thriving plants, and bless the heavenly dew.”—Phillips.

15 Τύχη, τυγχάνω “to happen, fall out, come by chance.”

The absence of aqueous vapour makes a Sahara; its presence, an oasis. Huxley says, “The well-being and even the very existence of every living thing is absolutely dependent on the composition of the air.”

19 τανύσφοροι, τανύω σφυρά “to beat with the hammer.” So too we say “the pattering of the rain;” and one writer on elementary geology makes use of the words “those tiny hammerers” for the raindrops. And if, as is probable, *tiny* be derived from the Latin *tenuis*, which certainly comes from *τείνω* or *τανύω*, the word τανύσφοροι will literally signify “tiny hammerers.”

23 Ὠκεανοῦ.—The usual derivation is ὠκὺς νάω, “rapid flowing,” or “flexibly flowing;” ὠκὺς ἐάνον, “the flexible mantle,” would suit equally well, and be more in accordance with the characteristics.

Apollodorus, while mentioning the number of the Oceanides as 3,000, enumerates but six, namely Asia, Styx, Electra, Doris, Eurynome, and Metis. At the same time he introduces as one of the Oceanides, Amphitrite, the wife of Neptune, whom Hesiod classifies as a Nereid, calling her ἑὺσφύρῳ Ἀμφιτρίτῃ, “the well-hammering Amphitrite,” as the waters of the seas beat and dash the rocky coasts of the neighbouring lands. When Apollodorus says that Oceanus alone of all the Titans did not enter into the conspiracy against Uranus, he means that this aqueous vapour is of far-reaching extent, permeating possibly the ether that unites all the bodies of our Universe; or else, that disruption of the firmament could not take place were the elements of this aqueous vapour present to interfere with the heat evolved in the act of separation. Well, therefore, have θεῶν γένεσις, ὅσπερ γένεσις πάντεσσι τίτκεται, Oceanum, patrem rerum, and other like epithets been applied to Oceanus.

But far more frequently, and with equal significance, has another class of epithets been assigned him, such as μέγας, ἀκαλάρβειτης, βαθύρροος, ἀψόρροος, Ὠκεανός ποταμός, τελῆεις ποταμός, and ἱερός ποταμός. Vast as are the oceanic waters on our globe, and small though be the amount of aqueous vapour in a given quantity of air—from 4 to 16 grains in 1000—yet when we consider the extent and circumference of our atmosphere, we must believe that there is a much larger ocean above than below. This mighty aqueous vapour ocean has its own eddies, its own currents, its own storms; and under ordinary circumstances remains invisible, colourless, and transparent, until the air containing it is cooled below the point of saturation by the union of ærial currents of different temperatures, or by the rise of air into upper and colder regions of the atmosphere. In the one case saturation augments the aqueous vapour; in the other, expansion, radiation, and contact with the cold peaks of mountain regions, chill it. In both cases minute particles appear that retain a liquid, or more or less solid condition, according to the varying degree of tempera-

ture, and fill the upper region with masses of clouds, fantastic in form, and varying in size and altitude. Further condensation augments the size of those cloud particles, and finally they fall to earth as dew, rain, snow, hail, or sleet. In some one or other of those forms does this aqueous vapour fall on ocean, sea, and lake, on mountain, valley, marsh, and plain; it sinks even into earth itself, and permeates through the solid crust to unknown depths, or circulates through the tunnels and crevices which in great measure it has fashioned for itself underground. But this is not the end of the aqueous river from above: by the sun's heat this liquid downfall is again more or less collected from every part of sea and land on which it fell, and is raised as vapour to the airy regions whence it came, there again to be condensed to clouds, again to fall on earth, again to be restored to the realms above; and so on, without end.

Here is a vast system of circulation ceaselessly going on! From the first day a drop of water was formed on the nebulous confines of our globe to the present moment, the action has been the same; we behold, as Mythology tells us, a vast, soft-flowing ocean river, moving to depths below and to heights above, flowing back into itself; a perfect river, encircling earth as it does; a sacred river surely, as the gift of God, and as mentioned in sacred history:—

“But there went up a mist from the earth,
And watered the whole face of the ground.”

Genesis ii. 6.

How far does this aqueous vapour stretch? Our atmosphere is stated to extend 50 miles or so above earth, and is conjectured to reach to an inconceivable distance beyond this in a condition of greater or less tenuity. Wherever air is found, there certainly is aqueous vapour; and owing to the superior lightness of its constituents, it would be rash to assert that it could not exist in that common medium, if such there be, which binds all the bodies of our system, perhaps our universe.

It must be with an added interest and a broader interpre-

tation that we read such passages as have Oceanus or Tethys for their theme :—

Qua sol utrumque recurrens
Aspicit Oceanum. Æneid vii. 101.
Nos manet Oceanus circumvagus.—Horace Ep. xvi. 41.
Oceani finem juxta solemque cadentem,
Ultimus Æthiopum locus est : ubi maximus Atlas
Axem humero torquet stellis ardentibus aptum.
Æneid iv. 480.

Earth, then, is *one* of the banks of this endless river, and on this bank surely are the abodes of the dead : accepting the widespread diffusion of aqueous vapour, we see the reason, and must acknowledge the truth, why the sun and stars—of our system at least—should be described as rising and setting therein.

And when life and life's forces lie parched and breathless under a torrid sun, when the baked earth and glassy sea are incapable, as it were, of affording sufficient nutriment to being, then does a visit to this beneficent Oceanus invigorate and strengthen the drooping plant, the listless animal, and exhausted man.

“ The clouds consign their treasures to the fields,
And softly shaking on the dimpled pool
Prelusive drops, let all their moisture flow,
In large effusion, o'er the freshened world.”—Thomson.

CHAPTER III.

HYPERION, THE TIE OF WORLDS.

Hyperion.—The nebula at one time filled all space. When the firmament was separated there must have eventuated a differential space between the two. It is evident enough that this space would be constantly augmenting at the expense of a constantly contracting and diminishing nebulous mass, and that thither should rush all the cosmic matter given off through the æons whether by radiation or disruption.

Reasoning of the universe somewhat in the same fashion as we do of our System, we may suppose the combined forces of attraction and rotation on a constantly shrinking mass as resulting in a peripheral velocity so great that gravity would be overcome and the peripheral portion be detached.

This process, repeated again and again, would eventuate in the establishment of independent masses, the beginnings of the sun systems of the universe. We are also at liberty to imagine that instead of those repeated abstractions from the original nebula, there might have occurred but one, whereby far and away the mightiest portion would be detached as one mass, leaving but a minimum behind. The former would be evolved into the sidereal system by further disruptions; the latter, into our solar system.

However, or how manifold the division, there would be outer space to fill, and a rush of cosmic matter to fill it, each mass taking its destined place. This *rush of cosmic matter to outer space* would seem to be the Hyperion and Thea of the myths. The derivation of Hyperion from ὑπέρ ἰών, "moving above or beyond," is not satisfactory to many,

owing to the position of the accent. Now we find *παρά* and *διά* written *παρά* and *διαί* by Homer and others. If we do the same with this *ὑπερίων* and derive it from *ὑπερίων*, then the accent will be satisfied and we get for equivalent "being beyond" or "being above," which agrees with the idea of *outer space*. Again as to *Θεία*, we find *θέω* or *θείω* signifying "to run," "to rush," and intimately associated with *θύω*, the original sense of which Passow has suggested to be "to fire," "to burn." So that *Thea* and *Hyperion* would imply much the same notion as "the heavenly fires" of Milton, or "the incandescent orbs of space," as plain prose is sometimes forced to put it. Let us also remark that there is a suspicious resemblance between *θεία* and "heat," and still more so between it and the Gothic "heito," to which our English word is traced.

Θεία δ' Ἡελίον τε μέγαν λαμπρὰν τε Σελήνην
Ἥῳ θ', ἣ πάντεσσιν ἐπιχθονίοισι φαίνει
ἀθανάτοισι τε θεοῖσι, τοὶ οὐρανὸν εὐρὺν ἔχουσι,
γείναθ' ὑποδμηθεῖς Ὑπερίωνος ἐν φιλότῳ.—Theog. 371.

But in Hyperion's fellowship subdued,
Thia begot the mighty Sun, bright Moon,
And Eōs too, who shines o'er all terrene
And deathless gods that hold the heaven wide.

In plain prose, the *heat* of the separated nebulous mass was at length overcome by the temperature of outer space, overcome sufficiently to produce a Sun, a Moon, and Eōs.

Helios.—The same figurative mode of speaking which we use as bearing on the rising and setting of the Sun has been also largely used by the ancients. That the true system of astronomy was taught by Pythagoras and his disciples is well substantiated and recognised; and Ovid thus testifies to the sun's setting on one-half of the world only to illumine the other half:

Iipse Dei clypeus, terrâ cum tollitur imâ,
Mane rubet: terrâque rubet cum conditur imâ:
Candidus in summo est. Met. xv. 192.

God's shadow too, when raised o'er earth below,
The morning fires: and fires when hid from earth:
'Tis in the zenith bright.

1 clypeus.—So Byron in his *Manfred* :—

“Thou material God !

And representative of the unknown—

Who chose thee for His shadow.”

2 terrâque rubet—reddens the morning elsewhere.

The ancients described the Sun as traversing the heavens, in the same colloquial fashion we do ourselves, and the *golden boat* or couch in which he made the journey from west to east is simply figurative, after the same colloquial fashion, of the under half, so to speak, of our world being *illuminated* when the upper half is in darkness and in slumber.

Awake, we behold the Sun *racing* in the heavens, and *say so*, while recognising the reverse to be true: in darkness and asleep we cannot any longer continue the fiction of *a race* that we do not see; but to be consistent, colloquially consistent, we must get the Sun back *from* the west after the same quasi fashion we spoke of him as going *to* the west, and the myth of the golden boat, sailing along in an ocean of aqueous vapour, was evolved as the best solution of the problem, how to placate the deception of the senses. There could scarcely be a better. Cowley has imitated it, using “a clear river” for “a swift vessel” :—

“Through the soft ways of heaven, and air, and sea,

Which open all their pores to thee,

Like a clear river thou dost glide,

And with thy living stream through the close channel slide.”

Flammarion writes thus :—“ In the centre of this group shines the sun, a source of light which illuminates it, and of heat which warms it. Floating in the bosom of the space which surrounds it on every side, this group is like a fleet of many boats rocked in the ocean of the heavens.”

Further description of Helios does not come within the scope of this book, and though there are multitudinous myths connected with the Sun God, he does not enter prominently into the Hesiodic narrative which we are intending to follow as closely as possible.

Sufficient for our purpose is it that Helios is really our Sun, that there is no concealment about his personality ; for, as Virgil says,

“Solem quis dicere falsum audeat.”

Selene, too, is not essential to our narrative. So long as it is clearly recognised that our Moon is meant, we are satisfied, for the reasons mentioned already, to leave “the queen of night,” and proceed to others not so well understood.

Eos will be treated of best in connection with her consort *Astræus*. Let us remark, however, that, as the child of Hyperion and Thea, she too is cosmic matter,—that most ethereal form of it which composes our starry worlds, just as the Sun and Moon are less ethereal forms of the same matter.

CHAPTER IV.

SECT. 1.—CRIUS, THE TIE OF ORDER.

Crius.—"Order is Heaven's first law," sings Pope, and cavil as we may at the precedency, we must assent to the efficacy of the mighty power which the poet mentions. What is Order? It involves much or all that is implied in method, arrangement, system, manner, way, rule, design, plan, scheme, and organisation. There is a distinction discernible in all these: while design, plan, and scheme have reference usually to the totality of a thing, the others refer to the parts as connected with the whole; and while the dominant idea in "rule" is that of sway or precept, in "method" it is orderly procedure; and so on. But Order embraces them all, the general principle of arrangement as well as the idea of authority, the universal notions of some as well as the restricted meanings of others.

And yet this "Order" is too definite in its usually received application, too well developed to denote the incipency of what is implied—too mature, in short, to suit our purpose. There is another word, broader in meaning, more generic, and smacking more of the nebulous, which offers itself for approval; it is the word "*Course*." It involves all that Order does, and something more, as evinced in such phrases, "the course of creation," "a course of studies," "westward the course of empire wends its way," "the course of true love never did run smooth;" it is derived indirectly from the Greek *κείρω*; it has the additional advantage of being the correct English analogue for the particular Titan that Mythology has termed *Krîós*, and of whom we are now treating.

Whether *Krîós*, or as it is sometimes written *Kpeîos*, be derived from *κείρω* or from *κρίνω*, we shall not insist on, nor

need we, in as much as the radical of each word implies "to cut, to separate;" and so long as this idea of *separation* is kept in mind, the derivation leads up to the idea of Order,—that all-essential adjuvant to Evolution, which is but a change or separation from the simple to the complex. It is this notion of separation and consequent arrangement that Ovid has dwelt on when describing the events connected with the early construction of our universe and earth :

Nam cœlo terras, et terris *abscidit* undas,
Et liquidum spisso *secrevit* ab ære cœlum. Met. i. 22.
Sic ubi dispositam quisquis fuit ille Deorum,
Congeriem *secuit*, sectamque in membra *redegit*.
Met. i. 32.

Matter is observed only in its compounds. The atoms of which it is composed are beyond our ken. But from the day when first those atoms assumed existence there was a Crius which impelled them to arrange themselves definitely in molecules and compounds,—an order or course of being that was irrevocably associated with Eurybia (εὐρύς βία), with a *far-extended power* that reached from heaven above to earth and the denizens of earth. Alexander Pope has hymned this Titanic Crius as no other poet has ever done:

"Vast chain of Being! which from God began,
Natures ethereal, human, angel, man,
Beast, bird, fish, insect, what no eye can see,
No glass can reach; from infinite to thee,
From thee to Nothing. On superior pow'rs
Were we to press, inferior might on ours:
Or in the full creation leave a void,
Where, one step broken, the great scale's destroyed;
From Nature's chain whatever link you strike,
Tenth, or ten-thousandth, breaks the chain alike.
And if each system in gradation roll
Alike essential to th' amazing whole,
The least confusion but in one, not all
That system only, but the whole must fall.
Let Earth unbalanced from her orbit fly,—
Planets and stars run lawless through the sky;
Let ruling angels from their spheres be hurled,—
Being on Being wrecked, and world on world;
Heaven's whole foundations to their centre nod,
And Nature trembles to the throne of God."

From this nebulous course springs definite order, which may be subdivided into (1) constant and uniform; (2) changeable and multiform; and (3) a mixture of the preceding two, namely, that which is either constant and multiform, or changeable and uniform. The last two may be predicated of things terrestrial, and are symbolised respectively by the Pallas and Perses that are born of Crius. The first—the constant and uniform—is found nowhere but in the heavens, and is called Astræus as being observable only in “the movement of the stars” (ἄστρον ῥέω).

To this Astræus, the remaining son of Crius, was Eōs, the daughter of Hyperion and Thia, mated according to the myth.

SECT. 2.—THE CONSTANT AND THE DAWN.

Eōs.—When treating of Hyperion, it was mentioned how the parent nebula might be conceived, after the formation of a firmament, as disrupting into many successive portions, or into two very unequal masses, one to form our Solar System, the other to evolve the Sidereal System, and that as a consequence evolution would go on apace in both. The larger of these masses would by subsequent disruption be itself separated into other nebulae, and these into others, and so on, all varied as to size, shape, and distance, but all possessed of that faint, hazy, ill-defined light characteristic of the nebulae of our own day when viewed with the naked eye or telescope.

Nebulous matter may consequently be considered as the *dawn* of our universe, so far as the light from extended matter be considered. Comparing our Earth with its Sun the spectroscope shows many of the constituents of the former as resident in the latter. Thus proceeding from within outwards, we find in the reversing layer of the Sun traces of incandescent copper, nickel, cobalt, iron, and manganese; the spot zone exhibits titanium and sodium; the chromosphere presents the vapours of calcium and

magnesium ; and the coronal atmosphere, or outermost envelope, consists mainly of sub-incandescent hydrogen and one other not well-recognised element. And furthermore, as Lockyer has pointed out, those elements would appear to have succeeded each other according to their densities.

Again, comparing the Sun with the fixed stars, we find some like Capella, Arcturus, Aldebaran, and others, to resemble it so closely in the character of the light emitted as to prove them to contain the same constituents ; others, like Sirius, Vega, and many more, show by the preponderance of the hydrogen line that they are hotter, and brighter, and consequently less evolved in the order of being than our own Sun ; still others, and particularly the majority of the red-coloured stars, show by their banded spectra that they are more advanced in progress than our Sun, that they are cooler, "dying out Suns," as they have been termed.

Once again comparing those fixed stars with the "star clustres," distinguished for their isolation, variety in form and size, and for different degrees of condensation, we find the purely gaseous spectra observed in only the hottest and whitest of the single stars, as Sirius, common to all the components of the "clustres," showing a less degree of evolution for them as a whole.

When, finally, we compare those "clustres" with the nebulæ, and note, as in certain of the spiral varieties, the rifts or dark spaces between the central nucleus and the surrounding rings, the convolutions round a central star, and the stars formed and forming in those very convolutions, with the connecting nebulous matter between the stars and convolutions, we are forced to believe that stars are formed, as Roberts puts it, "by the condensation of nebulosity, or by the aggregation of meteoric or other cosmic matter."

Reasoning thus from Earth to Sun, and from Sun to single stars, star clusters, and nebulæ, we discover a chain of evidence proving that the stars are formed of nebulous

matter, and are cooling to the condition of our Sun,—that all, it matters not how slowly, are approaching the condition of our Earth; and reversely, that our Earth, cold and shrunk as it now is, was once like its own Sun, could at one time compare with Sirius in heat and brilliancy, and was composed of luminous gas, the first stage we know of in evolution from purely nebulous matter.

This nebulous matter, then, that broke away from its smaller partner and, soaring upwards, assumed an upper place in space, to be subsequently itself subdivided, may be looked on as the *dawn of created matter, begetter of the stars*, and the early precursor of the light which was emitted by those stars, our Sun included. But this is Eōs, or Aurora, child of Hyperion and Thia, mother of the stars, and precursor of the morning red. By her alone was the light of matter visible, faintly and indefinitely like our dawn, when the sidereal system was yet in its nebulous incipency, and when our Sun was in embryo; by her, assisted by the methodical procedure of her spouse Astræus, were Sirius, “the monarch of the skies,” the “demon” Algol and the “variable” V of Cygni, were the white Vega and yellow Capella, the orange Arcturus, Aldebaran the red,—were all the hosts of heaven brought into being and nursed from infancy to age, from nebulosity to luminosity; by her and by him was our own System evolved into Sun and planets; and by her is the light of former days, still resident in the stars, brought to us each morning when the goddess driving her steeds, Lampus and Phæthon (*φάος ἔθεων*), ushers in the dawn.

“Of Eōs and Astræus were the winds and stars,” is the brief description of Apollodorus. The ascent of heated air, or nebulous matter, is an all-important and well-understood factor in the causation of winds. Much more important must it have been in the very early youth of our globe when heated nebulous matter was more potent and more extended over its surface, and when there existed no such obstructions as mountain peaks, or even continents, to

the production of those northerly, westerly, and southerly winds which we call *constant* (as opposed to the periodical and variable winds), and which under the name of trade winds are the prevailing type to-day in the equatorial regions. Bearing in mind that nebulous matter is Eōs, and that Astræus is the symbol of *constant* or unvarying order, we can see why the myth has made the *Constant* Winds children of Eōs and Astræus. The other winds, it will be remembered, had as progenitors Thaumās and Electra, and did not come into being till after the time of Kronos, since Hesiod says, “μεταχρόνιαι γὰρ ἱαλλόν.”

There was a day, then, when Earth was as bright and hot as Sirius; when, later, it was as brilliant as our Sun; when, still later and covered with its primal crust, the surface glowed with heat from pole to pole. But even so, there was ever an unceasing radiation of its heat to outward space, a radiation that continued through all the ages from the Archaic to the Cainozoic. Colder and more shrunken then did Earth get to be from age to age; the polar regions were the first to suffer, and the heat was being constantly transferred towards what is now the equatorial zone.

It is this theory of Earth's progressive cooling that has been incorporated into mythology under the fable of Eōs and Tithonus.

Heat was carried away from Earth as a whole, and gradually transferred from the poles to the tropics: Tithonus, *τι θύων* “heated matter,” was carried off by Aurora to Æthiopia, *αἰθων ὄψ*; “Tithonusque remotus in auras,” as Horace says. But our Earth, or the matter of it, will always possess some heat: Aurora obtained immortality for Tithonus. The consequence of progressive radiation of heat has been to make Earth colder and more contracted: so too did Tithonus lose the freshness of youth and grow shrunken in his old age; “*Longa Tithonum minuit senectus*,” as Horace says again. Science asserts that changes of climate have been recurrent on our globe, that the glaciation of one hemisphere and warmth of the

other has been the rule, and that such alternate conditions occur every ten or twelve thousand years.

Though Earth, then, may grow colder and colder, it retains sufficient heat to nourish the vital spark—Tithonus cannot die;—and by transferring the snow and ice from one hemisphere to the other, it continues its existence: even so some myths relate that Tithonus was changed into a grasshopper, an insect that according to old belief, moults when it is old and grows young again.

- 1 Ἀστραῖφ δ' Ἡὼς ἀνέμους τέκε καρτεροθύμους,
ἀργέστην Ζέφυρον, Βορέην τ' αἰψηροκέλευθον
καὶ Νότον, ἐν φιλότῃ θεᾷ θεῶ εὐνηθείσα.
τοὺς δὲ μέτ' ἀστέρα τίκτεν Ἑωσφόρον Ἐριγένεια.
- 5 ἄστρο τε λαμπετόωντα, τὰτ' οὐρανὸς ἔστεφάνωται.—Theog. 378.

Couched with the god in sweet companionship
Did Eōs for Astræus bear the winds,
The constant winds, the placid Zephyrus,
The drying Boreas, and Notus too.
Then after these Erigeneia bore
Phosphor, the star of morning, and the stars
That steady shine, and those that deck the sky.

NOTES.

- 1 καρτεροθύμους.—Stout-hearted, enduring, *constant*.
- 2 ἀργέστην.—ἀργέω “to be unemployed, to rest.” So Ovid, “placidi Zephyri.”
αἰψηροκέλευθον.—αἰεὶ ψηρός κέλευθον, “ever drying the ways.” The North Wind is *dry* and cold. In the latter sense Ovid uses “horrifer Boreas.”
- 3 καὶ Νότον.—The South Wind was born last, as being essentially the one that brings *rain*. Ovid too, describing the arrangement of the Winds in his Metamorphoses, lines 61 to 66, puts Auster, the South Wind, last.
- 4 τοὺς δὲ μέτ' ἀστέρα.—The words can also be rendered, “And these did Erigeneia beget after the star Phosphorus, &c.” But we prefer the rendering given, since not only does Hesiod *commence* with the formation of the winds, but also Apollodorus, who says “Ἡοὺς δὲ καὶ Ἀστραίου ἄνεμοι καὶ ἄστρο.” In Genesis, too, the Sun, Moon, and Stars were the work of the Fourth Day, which period, as we shall find, was posterior to the “Golden Age” of Mythology. When writing of this Age, Ovid makes distinct mention of the existence of winds:—

“Ver erat æternum : placidique tepentibus auris
Mulcebant Zephyri natos sine semine flores.”

And it is not till after the formation and distribution of the Winds that he says :—

“ Vix ea limitibus disseperat omnia certis :

Cum, quæ pressa diu massâ latuere sub illâ,

Sidera caeperunt toto effervescere cælo.” Met. 69.

Ἠριγένεια.—An epithet of Eōs, and used frequently as such in the Iliad and Odyssey. It has been variously taken to mean “early born,” “morn-producing,” “child of morn,” and “mother of morn.” Of all four, the first, “early born,” is the closest to the derivation assigned, *ἥρι γείνομαι*. It may equally well be derived from *ἥηρ* or *ἀήρ γείνομαι*, and would thus signify “air bearing,” or “air born,” that is, producing the winds, and sprung from nebulous or airy matter. Erigeneia would thus be both the child of air and the mother of air.

5 *ἄστρο λαμπερόντα*.—The planets that shine with a steady light : *τάτ' οὐρανός ἐστεφάνωται*, the fixed stars.

SECT. 3.—THE CHANGEABLE AND THE GLOOM.

Pallas. *Κρίω δ' Εὐρυβίη τέκεν ἐν φιλότῃ μιγείσα*
Ἀστραῖόν τε μέγαν Πάλλαντά τε δία θεάων
Πέρσην θ', ὅς καὶ πᾶσι μετέπρεπεν ἰδμοσύνησιν.—Theog. 375.
 Eurybia, with Crius mingled, bore
 Astræus mighty, Pallas god of gods,
 And Perses who in skill outvies them all.

It is safe to assert that as the stars shine and move to-day, so did they shine and move when gazed on by the first man, probably by the first animal, that ever moved upon this Earth. An order characterised by constancy of being and uniformity of motion has been theirs, and has been symbolised by Astræus in the myths. But there is another kind of order begotten of the general course of creation, a terrestrial order that deals peculiarly with our own globe and its inhabitants. While the heavenly bodies as a whole have not changed in their nature, movement, or apparent position, our Earth as a whole has undergone many changes. It has from a luminous mass become an opaque one ; has been growing colder and colder ; has been accelerated or retarded in its motion by proximity or distance from the Sun round which it revolves ; has been covered in turn with incandescent gas, with water, and with a solid crust ;

has changed from a uniform season, that probably lasted for thousands of years, to a regular round of spring, summer, autumn, and winter. The construction of its crust too has been marked by variability; and as it was from the first so has it continued. The unceasing efforts of Evolution are changing the simple into the complex, and this into the more complex: those changes necessitate arrangement after arrangement in the matter, and subdivision after subdivision in the forces and motions; so that all is progressive, or retrogressive,—which is but progression backwards.

The type of order for the heavens is constant and uniform, that for earth is changeable and multiform: if Astræus be the symbol of one, then Pallas, as his brother, must have some valid claim to be the mythological representative of the other.

The derivation of the word is as suggestive as is its relationship to Astræus or its birth from Crius and Eurybia. The interchange of π and ϕ is quite common in the Greek, as instanced in *πανός*, *πάτνη*, &c., for *φανός*, *φάτνη*, &c.; so that *Πάλλας* is but a changed form for *Φάλλας*, which latter is derived from *φάω ἄλλος*, “appearing different.” Such cognates as *φαλλός*, the Bacchic emblem for Nature’s generating power, and *ἀλάσσω*, “to change,” “to alter,” “to make otherwise,” have reference to and fasten the derivation.

This is the Pallas who, when Crius was hurled to Tartarus, succeeded his nebulous, insufficient sire, and commencing where he left off, arranged and rearranged, and arranged again and again, the simple atoms into molecules and those into compounds, to form all things, organic and inorganic alike. “The elements,” says Miller, “have no more likeness to the compounds which they form than the separate letters of the alphabet have to the words which may be made from them.” Pallas is the great lexicographer of nature. He has taken the quartz, feldspar, and mica, which he fashioned, and from them made the granite and the gneiss to serve as a rocky basis; and when these were disrupted and changed—by his agency, too—he

once and again arranged their constituents, ever adding, ever altering, to produce the different strata which surround our globe. He works equally powerful in water and in air, forming the latter out of nitrogen, oxygen, carbonic acid, and other gases; the former from oxygen and hydrogen: he adds nitrogen to hydrogen and forms ammonia: from this he takes a little of the nitrogen and adds some oxygen, and the deadly nitric acid is the result.

And as it is with earth and water and air, so too is it with the organisms that have dwelt and dwell in all three habitats; for whether oak or algæ, shrimp or whale, fly or eagle, worm or mammoth,—all from the well-nigh structureless *Amœbus* to that most complete of beings, Man, have been moulded and framed, and their parts arranged by this variable order which has been fitly called by Hesiod, Πάλλαντ' ᾧ δῖα θεάων, “Pallas, the God of gods.”

And it is to this God of gods that Mythology has assigned a Styx; an atra, stagnans, tristes, inamabilis Styx, as partner! Willingly would we deny it, gladly disprove it, were it not that poet, preacher, and scientist, and grim experience, best teacher of all, assert the self-same fact and maintain that this particular myth, like all the others, is but a plain, unvarnished tale of fact, not fiction.

Styx.—Constructive order involves not only the matter which makes up the parts arranged, but also the motion exhibited during the arrangement as well as the force which produces this motion. Many causes, however, such as gravity, inertia, friction, &c., tend from the very first to produce continuous deductions in the motion; and continual division and subdivision tend to produce continuous dissipation of the force. It is evident then, that destruction is present from the very inception of construction, and that an agency exists which grimly follows on the steps of progressive order, biding its time, and watching for an opportune moment to assert its reality and to introduce another but reversed order of things. There is no uncertainty or doubt as to the fact. Science asserts in cold

language that for the whole and for the part Evolution or progressive order advances until a point is reached when the antagonising forces of integration and disintegration come to an Equipoise, or Equilibrium Mobile: this point reached, integrating forces yield to disintegrating ones, and a new order of arrangement begins. So that this Variable Order, which appertains to earth, consists ever and always of two elements. An algebraic formula but explains it. Representing the variables, Constructiveness and Destructiveness, by C and D, and the constant by O, then we have $C = (O - D)^2$, where Constructiveness is a *decreasing* function of Destructiveness for all values of D less than that assigned to O, and an *increasing* function of Destructiveness for all values of D greater than that of O. C and D are variables never apart; they are wedded to one another for weal or woe; the Order is constant. So is it with the constructive Pallas and destructive Styx that Mythology has wedded fast unto one another.

And what the philosopher has reasoned out, the preacher has proclaimed, and the poet has sung:—

“As man, perhaps the moment of his breath,
Receives the lurking principle of death;
The young disease that must subdue at length,
Grows with his growth, and strengthens with his strength.”

What Pope has applied to the part, Shakespeare has enunciated of the whole:—

“The cloud-capped towers, the gorgeous palaces,
The solemn temples, the great globe itself,
Yea, all which it inherit, shall dissolve!
And like this unsubstantial pageant faded,
Leave not a rack behind.”

Still, nothing has been lost. It is true that a something which we call Life has departed; but for Matter itself, the same forces remain, and the round of Order, though now retrogressive, still proceeds. What is left, whether incorporated for a while or not, will sooner or later moulder and be resolved into the elements from which they sprung. In either case subsisting life is benefited,

and the sum total of matter remains the same. Young has expressed the idea aptly in his "Night Thoughts."

"Look nature through: 'tis revolution all;
All change; no death. Day follows Night, and Night
The dying Day; stars rise, and set, and rise;
Earth takes th' example.

* * * * *

All to refflourish fades;
As in a wheel, all sinks to reascend,
Emblems of man, who passes, not expires."

At what stage the dreaded equilibrium mobile occurs, we know not. There is undoubtedly a *natural* limit assigned to all, to hill and vale, river and forest, and to every being that moves in water, air, or earth; but with this, and independent of this, there is the terrible uncertainty and fear of death or destruction which is ever impending over all. When Ovid describes Zeus as pledging his word to Semele, he puts the following into the mouth of the god:

Quoque magis credas; Stygii quoque conscia sunt
Numina torrentis—Timor, et Deus ille Deorum.

Met. III. 290.

And that the more reliant thou may'st be;
Let these, the Stygian torrent's guardians, Fear
And he, the God of gods, bear witness too.

We must all drink of this torrent on the way, but how long we know not. The earthquake, landslide, volcano and glacier, have brought ruin on many a towering peak, fertile plain, and meandering stream, and have buried them and all organisms upon them fathoms deep under rock and clay and ice and lava: the budding plant has been nipped by frost, the stately oak been levelled by lightning, the cyclone, or the axe: all these forces, and with them war, disease, famine, care, and pestilence, have hurried away by an untimely end millions of men, and animals inferior to men. Hurried them to where? Sooner or later beneath the earth. Flesh may be devoured by flesh, man's by animals, and animal's by its own kin or by men; but earth eventually swallows destroyer and destroyed. This is in part one phase—the physical—of the celebrated

Metempsychosis of Pythagoras ; and it is with this idea that much of what Ovid has written in his 15th Book of the *Metamorphoses* must be read.

Heu quantum scelus est, in viscera viscera condi,
Congestoque avidum pinguescere corpore corpus ;
Alteriusque animantem animantis vivere letho !

Met. XV. 88.

To bury flesh in flesh, fat greedy frame
With mass congested, and retain life's spark
By life's destruction ;—oh ! how loathsome 'tis !

Omnia mutantur : nihil interit. Errat, et illinc
Hùc venit, hinc illùc, et quoslibet occupat artus
Spiritus : èque feris humana in corpora transit,
Inque feras noster : nec tempore deperit ullo.

Met. XV. 165.

Things change ; nought perishes. Life's spirit roams,
And to and fro, repeatedly, it comes,
And occupies whatever frames it may ;
The beast's to human, ours to beasts, doth go :
And yet at no time passes it away.

There is a downward tendency, a *via declivis*, for all existences created. Gravity alone urges us thither, says philosophy ; and geology teaches that our broadest continents and highest mountains were once and again beneath the surface,—and may be so again, for all that we are absolutely assured of. And as regards organic life the same holds good. Man's last duty to his departed fellows, the cultivation of the soil, the downward force of rain and snow and ice, the floods of overflowing rivers, the tidal waves and inundations of the sea, the earthquake and volcano, and that constantly slow but sure subsidence going on in different regions at a time,—all these and other causes tend eventually to make organic beings disappear from view beneath the surface, there to decay, moulder, putrefy, and be dissolved into their original elements.

How far beneath ? Who can tell. It is safe to say, however, that the elementary particles can be carried to whatever depth the water derived from rain, snow, and melted ice, can penetrate. Of all this water, some goes off with the streams and rivers down to the deep sea, but by far the

greater part sinks into the ground. Of this latter a portion reappears upon the surface as springs and wells, and sometimes even as rivers: the remaining portion we never behold unless some of nature's convulsions cause it to appear once more in the steam of volcanic outbursts or in the sudden mutations arising from earthquakes. We cannot tell what proportion of the whole is thus detained below and prevented from rising, but judging from the rainfall and melting snow and from the fact that the floors of sea and ocean as well as the beds of rivers and lakes are all leaky, it is stated that the amount of underground water itself must be enormous. Even the rocks and minerals are not capable of resisting its downward progress. The fragmental rocks, whether sand or clay, coal or chalk, limestone or other, contain water; so do the metamorphic rocks beneath them, and even in the granite basis of our globe has it been discovered. The microscope has found in every rock and mineral a series of minute interstices between the particles or crystals of which they are composed, and through those interstices and through even the particles themselves has water been proved to be capable of infiltrating. The smaller and closer the interstices the more difficult will be the passage, but the fact remains that no rock or mineral, not even flint, is absolutely impervious to the permeation of water. And when it does reach in some places a relatively impervious layer, it proceeds to form there pools or lakes, and the surplus water overflowing percolates through some more porous beds till at length it finds a devious way beneath the obstruction to its downward trend. That water not only passes down, but that it also *circulates* under ground in channels and tunnels, formed along the natural joints and crevices of the rocks, and widened by its own mechanical action, is evidenced from the occasional rise of leaves, twigs, and even live fish, in the shafts of artesian wells bored in the sandy deserts of Algeria and other like regions where there is no surface water and where rain seldom if ever falls,—thus proving that the water, which must have come from a distance many

leagues away, has circulated for miles and miles beneath the surface.

To whatever depth it goes, there is not a particle of organic or mineral matter secure from its attacks.

As rain, it always absorbs some of the air through which it falls, and thus becomes possessed of carbonic acid gas and organic germs, with minute quantities of other ingredients with which our atmosphere is freighted.

By virtue of its own powers as a solvent, and aided by these auxiliaries, it proceeds to disintegrate the surface rocks by hydration, weathering, solution, oxidation, deoxidation, and mechanical action.

Carrying with it the same reagents it sinks into the earth, thereto pursue even more markedly the disintegration and decomposition it had begun above. It now, too, gains fresh forces from the abundant organic matter it meets with in the soil and from the reservoirs of carbonic acid gas it finds pent up in the natural cavities below. No substance, it is said, is capable under certain conditions of resisting the solvent force of water containing carbonic acid: the water in its downward course finds those conditions in the increased heat and pressure and the recruits of decomposition. Armed thus, it defies the resisting powers of all—even the siliceous rocks—that bars its progress or its circulation. And as it goes it ever scoops out, first the most yielding and friable of obstructions, leaving the more massive and hardier to stand. Chemically and mechanically working, it trickles along here, in a fuller stream there, forms a pool or lake or cascade elsewhere, winds round some hardy, opposing rock to attack its weaker neighbour, swells out in some cretaceous bed to form caves that throw our Mammoth into insignificance and that are, it may be, supported with pillars of chalcedony and chert and other lustrous varieties of quartz. But it ever goes down, down. Not mere imagination this: Every spring that comes to the surface brings the *débris* of the work going on below, and the immense deposits of sulphur, lime, magnesia, iron, soda, salt, silica and mineral oil brought up, must represent

a corresponding waste of matter below, and as a consequence the existence of tunnels, caves, lakes, and river beds. Ramsay has estimated the annual discharge of mineral matter from the warm springs of Bath to be equal to a square column 9 feet in diameter and 140 feet in height. And this is only for a single year and for a minor spring !

To what depth this surface water is capable of descending is not absolutely known. There is nothing, as we have shown, to prevent it from sinking to the granitic or other crust that overlies the interior fires of our globe ; it is even asserted that it may infiltrate this and be a means of so rousing up the central fire as to produce the volcanic outbreaks of to-day, just as it may have helped to produce those of a former age. Daubrée has shown that capillary water has the capacity of penetrating rocks even against a high counter pressure of vapour, and that water at extreme depths may be under such a pressure as to retain its liquid condition at a red or even at a white heat.

Let us review :

We have a vast body of underground water,—begotten of aqueous vapour, circulating in the stratified beds,—reaching to the solid crust, and probably infiltrating into the fiery depths of the nucleus,—carrying with it from the surface down the hydrated and sodden remains of all organisms bereft of life, and, though very slowly, of inorganic dust ; and while carrying them, witnessing and helping in the resolution of those bodies, of the compound rocks and vegetable fibre, of animal flesh, of the gray matter of the brain and of all that is latent in this gray matter.

Let us compare :

We have Styx,—born of Oceanus,—that river of the nether world round which it flows nine times,—connected with the more central rivers of Acheron, Cocytus, and Pyriphlegethon,—that hateful Styx which we all dread to embark on ; that gloomy Styx which when our bodies *have* to cross, the quicker the better, for corruption is more loathsome by its slowness ; that Styx which is open for our voyage provided a little clay be sprinkled over our

remains ; Styx from which we are assuredly kept back for a period by suffering a too slow decay for want of a little earth denied us by poverty, by shipwreck, or the ferocity of savage beasts.

There is nothing mythical—to use the word in its baser sense—in this Styx. It is a reality, as substantial, alas ! as the underground waters themselves ; a real river which, dreadful though it be in anticipation and the changes that accompany it, we must all embark on soon or late.

“ Our life is onward—and our very dust
Is longing for its change, that it may take
New Combinations.”

The explanation given will tend to solve what has been much of a puzzle to translators of the classics, namely, why Styx has been sometimes described as a *river*, at other times as a *lake*, and again as a *stagnant pool*. It would be an almost endless task to quote the passages where Styx is mentioned, but we give the following from Ovid :

- 1 Est via declivis funestâ nubila taxo :
Ducit ad infernas, per muta silentia, sedes.
Styx nebulas exhalat iners, umbræque recentes
Descendunt illâc, simulacraque functa sepulchris.
- 5 Pallor, hyemsque tenent late loca senta : novique
Quà sit iter manes, Stygiam quod ducit ad urbem,
Ignorant, ubi sit nigri fera regia Ditis.
Mille capax aditus, et apertas undique portas,
Urbs habet. Utque fretum de totâ flumina terrâ,
- 10 Sic omnes animas locus accipit ille : nec ulli
Exiguus populo est, turbamve accedere sentit.
Errant exsanguis sinè corpore et ossibus umbræ :
Parsque forum celebrant, pars imi tecta tyranni ;
Pars aliquas artes antiquæ imitamina vitæ
- 15 Exercent ; aliam partem sua pœna coercet.—Met. IV. 432.

Downward's the path obscured by dismal yew :
Through silence mute to nether climes it leads.
There sluggish Styx exhales its fogs ; and shades
Just laid to rest, and such as are but graced
With empty honours of a tomb, descend.
Pallor and cold those sentines widely hold :
And manes new know not what way may be
That to the grewsome stronghold doth conduct
Where stands the cruel court of swarthy Dis.

Full many avenues and open gates
 On all sides hath this stronghold vast. And as
 From every land the sea receives the streams,
 So too all beings does this place receive :
 Nor cramped it is by race of any kind,
 Nor recks it of the crowd that ever comes.
 There wander shades sans blood, sans flesh, sans bones :
 Part throng the deck, and part the very roof
 Of central tyrant force ; some devious ways,
 A past life's semblances, are used by more ;
 Still others their own punishment restrains.

NOTES.

- 1 *funestâ taxo*.—So Byron :
 “ The very cypress droops to death—
 Dark tree, still sad when others’ grief is fled,
 The only constant mourner o’er the dead.”
- 3 *iners*.—Dissolution is in its beginning just below the surface.
- 5 *loca senta*.—Filthy places, sink-holes. “Sentines,” though marked in our dictionaries as obsolete, should be restored if only for propriety’s sake.
 “ A stinking sentine of all vices.”—Latimer.
- 6 *Quà sit iter*.—There are many and devious paths for the underground water.
urbem.—Literally “ a walled town,” and thus most applicable to the rocky crust immediately surrounding the *central fire*, the *fera regia*.
- 10 *nec ulli exiguus*. “ ’Tis here all meet !
 The shivering Icelfander, and sunburnt Moor ;
 Men of all climes that never met before ;
 * * * * *
 The wrecks of nations, and the spoils of time,
 With all the lumber of six thousand years.”—Blair.
- 13 *Forum*—that is, from the surface of the earth all the way down. *forus*, the deck or hatch of a ship, which is above, and leads from deck to deck down to the hold or cellar.
tecta.—The rocky crust covering the *central fire*, *imi tyranni*.
- 14 *artes*.—The *sinuous* or winding passages through the rocks. *imitamina*.—“ E’en in our ashes live their wonted fires.”—Gray.

Hesiod gives two descriptions of Styx. The first bears on the help she afforded Zeus in his battle with the Titans :

- 1 Στύξ δ’ ἔτεκ’ Ὀκεανοῦ θυγάτηρ Πάλλαντι μύεισα
 Ζῆλον καὶ Νίκην καλλίσφυρον ἐν μεγάροισι
 καὶ Κράτος ἦδ’ Βίην ἀριδείκετα γείνατο τέκνα,
 τῶν οὐκ ἔστ’ ἀπάνευθε Διὸς δόμος, οὐδέ τις ἔδρη,

- 5 οὐδ' ὁδὸς ὅπη μὴ κείνοις θεὸς ἡγεμονεύη
 ἀλλ' αἰεὶ παρ Ζηνὶ βαρυκτύφῳ ἐδριώνεται.
 ὧς γὰρ ἐβούλευσε Στύξ ἀφθιτος Ὠκεανίνῃ
 ἡματι τῷ ὅτε πάντας Ὀλύμπιος ἀστεροπητῆς
 ἀθανάτους ἐκάλεσσε θεοὺς ἐς μακρὸν Ὀλυμπον,
 10 εἶπε δ' ὃς ἂν μετὰ εἶο θεῶν Τιτῇσι μάχοιτο,
 μή τιν' ἀπορραΐσειν γεράων, τιμὴν δὲ ἕκαστον
 ἐξέμεν ἦν τὸ πάρος γε μετ' ἀθανάτοισι θεοῖσι.
 τὸν δ' ἔφαθ', ὅστις ἄτιμος ὑπὸ Κρόνου ἦδ' ἀγέραςτος,
 τιμῆς καὶ γεράων ἐπιβησέμεν ἢ θέμις ἐστίν.
 15 ἦλθε θ' ἄρα πρώτη Στύξ ἀφθιτος Οὐλυμπόνδε
 σὺν σφοῖσιν παιδεσσι φίλον διὰ μῆδεα πατρός.
 τὴν δὲ Ζεὺς τίμησε, περισσὰ δὲ δῶρ' ἀπέδωκεν.
 αὐτὴν μὲν γὰρ ἔθηκε θεῶν μέγαν ἔμμενοι ὄρκον,
 παῖδας δ' ἥματα πάντα ἐοῦ μεταναιέτας εἶναι.
 20 ὧς δ' αὐτῶς πάντεσσι διαμπερές, ὥσπερ ὑπέστη,
 ἐξετέλεσσ'. αὐτὸς δὲ μέγα κρατεῖ ἡδὲ ἀνάσσει.—Theog. 383

With Pallas mated Ocean's daughter, Styx,
 Bore Zeal and Victory that's rounded well
 Within the crypts; well-guiding Strength and Might
 She also bore, an offspring whose abode
 Is not aloof from Jove; nor certain seat
 For single one of these, nor way whereby
 A god may point the path; but ever near
 Loud-sounding Jupiter they take their stand.
 For so advised the Oceanian born,
 Imperishable Styx, that fateful day,
 When to Olympus wide all deathless gods
 Th' Olympian light'ner summoned, and declared
 No one of gods who'd fight the Titan crew
 With him should lose his claims,—that each would have
 The self-same honour 'mongst the immortal gods.
 This too he said, whoe'er 'neath Kronos was
 Unhonoured and untitled, he'd attain
 To rank and titles such as right 'twould be.
 So then by means of her beloved sire
 Was Styx imperishable first to come
 Towards Olympus, and her sons with her.
 Zeus honoured her and gave surpassing gifts.
 Herself indeed he made the gods' great oath;
 Her sons, to be his changelings for all time.
 In self-same manner for the others all
 Precisely as he pledged himself he did;
 And great his strength, and mighty does he rule.

NOTES.

- 2 *Ζῆλον*. “Not Kings alone,
Each villager has his ambition too.”—*Young*.
Νίκην καλλίσφυρον.—*καλλι-σφαιρόω*, “well-rounded.”
“Our little life is rounded with a sleep.”—*Shakespeare*.
“For with thy side shall dwell at last
The victory of endurance born.”—*Bryant*.
μεγάροισι.—*μεγάρως* signifies “a large common hall,” “a house of many rooms,” and so earth, as a vast cemetery. *τὰ μέγαρα* were “the underground caves” sacred to Demeter and Proserpine.
- 3 *ἀριδείκετα*. “’Tis great to have a giant’s strength,
But tyrannous to use it.”
- 4 *οὐκ ἀπάνευθε Διὸς*.—A generation dies; but its passions, all embraced by zeal, victory, might, and strength, survive.
- 5 *οὐδέ τις ἔδρη, οὐδ’ ὁδός*.—There is a different ideal for all, but the way to it is not always the same; there is no royal road to success or learning.
“Life is before ye!”—from the fated road
Ye cannot: turn then, take ye up the load.
Not yours to tread or leave the unknown way,
Ye must go o’er it, meet ye what ye what ye may.
Mrs. Butler.
- 15 *ἦλθε Στύξ*.—Decomposition is a prime factor in fertilising the soil, and is thus an auxiliary, the first, for Zeus or Life.
“But creeping things shall revel in their spoil,
And fit thy clay to fertilise the soil.”—*Byron*.
“Life mocks the idle hate
Of his arch-enemy, Death;—yea, seats himself
Upon the tyrant’s throne, the sepulchre,
And of the triumph of his ghastly foe
Makes his own nourishment.”—*Bryant*.
“That which thou sowest is not quickened, except it die.”
1 Corinth. xv. 36.
- 16 *διὰ μήδεα πατρός*.—By means of aqueous vapour, or of evaporation, is the soil pulverised, decomposition brought to the surface, and life thus benefited.
- 18 *μέγαν ὄρκον*.—Dissolution accompanies us from birth, and life’s tenure is uncertain. What then can be the most binding oath for Life (Zeus), but the *fear* and *reality* of Death, that is, Styx?
- 19 *μεταναίετας*.—There is no annihilation of matter; death in one form is but a resurrection in another.
“There is no rest in all the realms of life;
Man’s an epitome of endless strife.”

After Zeus had hurled the Titans into Tartarus, Hesiod gives a further description of Styx :

- 1 Ἐνθα δὲ ναιετάει στυγερὴ θεὸς ἀθανάτοισι,
 Λεινὴ Στύξ, θυγάτηρ Ἀφορροῦ Ὠκεανοῖο
 πρεσβυτάτη. νόσφιν δὲ θεῶν κλυτὰ δώματα ναίει
 μακρῇσιν πέτρῃσι κατηρεφέ'. ἀμφὶ δὲ πάντῃ
 5 κίουσιν ἀργυρέοισι πρὸς οὐρανὸν ἐστήρικται.
 παῦρα δὲ Θαύμαντος θυγάτηρ πόδας ὠκέα Ἴρις
 ἀγγελίην πωλεῖται ἐπ' εὐρέα νῶτα θαλάσσης,
 ὅππότε ἔρις καὶ νείκος ἐν ἀθανάτοισιν ὄρηται,
 καὶ ῥ' ὅτε τις ψεύδεται Ὀλύμπια δώματ' ἐχόντων,
 10 Ζεὺς δὲ τε Ἴριν ἔπεμψε θεῶν μέγαν ὄρκον ἐνεῖκαι
 τηλόθεν ἐν χρυσῇ προχόῳ, πολυώνυμον ὕδωρ,
 ψυχρόν, ὃ τ' ἐκ πέτρης καταλείβεται ἡλιβάτοιο,
 ὑψηλῆς· πολλὸν δὲ θ' ὑπὸ χθονὸς εὐρυοδείης
 ἐξ ἱεροῦ ποταμοῖο ῥέει διὰ νύκτα μέλαιναν
 15 Ὠκεανοῖο κέρας· δεκάτῃ δ' ἐπὶ μοῖρα δέδασται.
 ἐννέα μὲν περὶ γῆν τε καὶ εὐρέα νῶτα θαλάσσης
 δίνης ἀργυρέης εἰλιγμένος εἰς ἅλα πίπτει,
 ἥ δὲ μὲν ἐκ πέτρης προρέει μέγα πῆμα θεοῖσιν.
 ὅς κεν τὴν ἐπιόρκον ἀπολείψας ἐπομόσση
 20 ἀθανάτων, οἳ ἔχουσι κάρη νιφόντος Ὀλύμπου,
 κείται νήϊνμος τετελεσμένος εἰς ἐνιαυτόν,
 οὐδέ ποτ' ἀμβροσίης καὶ νέκταρος ἔρχεται ἄσπον
 βρώσιος, ἀλλ' ὅγε κείται ἀνάπνευστος καὶ ἀναυδος
 στρωτοῖς ἐν λεχέεσσι, κακὸν δὲ ἐκῶμα καλύπτει.
 25 αὐτὰρ ἐπὶ νούσον τελέσῃ μέγαν εἰς ἐνιαυτόν,
 ἄλλος δ' ἐξ ἄλλου δέχεται χαλεπώτερος ἄθλος.
 εἰνάτες δὲ θεῶν ἀπομείρεται αἰὲν ἐόντων,
 οὐδέ ποτ' ἐς βουλὴν ἐπιμίσγεται οὐδ' ἐπὶ δαίτας
 ἐννέα πάντα ἔτεα· δεκάτῃ δ' ἐπιμίσγεται αὖτις
 30 εἰρέας ἀθατάτων, οἳ Ὀλύμπια δώματ' ἔχουσι.
 τοῖον ἄρ' ὄρκον ἔθεντο θεοὶ Στυγὸς ἀφθιτον ὕδωρ,
 ὠγύγιον, τό θ' ἦσι καταστυφέλου διὰ χάρον.—Theog. 775.

There, hated by immortals, lies dread Styx,
 Of backward flowing Ocean eldest child :
 Apart from gods there lie those famed abodes
 Roofed o'er with mighty rocks, and all around
 With shining pillars heavenwards they've been propped.
 Once in a while upon her message goes
 The child of Thaumās, Iris swift of foot,
 O'er the broad surface of the deep when strife
 And rivalry are 'mongst immortals roused ;
 And surely then, when some of those that had
 Olympian domes perverted grew, and Zeus
 Sent Iris forth to bring from far away
 In rich outpouring the great oath of gods,
 The well-known water, cold, and trickling from

The rock that's seated deep and towers on high.
 And far 'neath fissured earth through black of night
 This branch of ocean's sacred river runs ;
 But tenth has been the measure fixed by fate.
 For nine, in silvery spires rolled round the earth
 And sea's broad back, falls one into the deep ;
 But forward flows this other from the rock,
 A grievous scourge to the immortals all.
 Of gods that hold Olympian snowy peaks,
 Whoe'er for this has left the pledge he took,
 Senseless he lies for the predestined time,
 Nor e'er of sustenance desirous comes
 Near to the nectar and ambrosia, but
 Breathless and voiceless lies he there within
 The stratified beds, and comatose as 'twere.
 But when this suffering for ages long
 He has discharged, another task's received,
 Another, and another, more severe.
 For periods nine away from livelong gods,
 Nor once he's mixed in council nor in feast
 The full nine cycles long ; but on the tenth
 Once more he's mingled with the host of gods
 Immortal who Olympian domes possess.
 Such then the oath the gods have made of Styx,
 Of its imperishable water, old ;
 And such through regions rugged down it goes.

NOTES.

- 4 μακρῆσιν πέτρῃσι.—Owing primarily to unequal contraction of the crust, and subsequently to subterranean agitation and the chemical action of underground water, the whole thickness of the earth's rocky covering is supposed to be extensively fissured and intersected with tunnels and caverns.
- 9 Καὶ ῥ' ὅτε.—Occasionally, says the poet, does the rainbow go forth upon its mission ; *but surely* did it go forth once when the greater part of mankind and of earth grew corrupt (τῆς ψεύδηται), and there ensued a Deluge that brought back the Stygian waters to aid in the general destruction.
- “In the six hundredth year of Noah's life, in the second month, the seventeenth day of the month, the same day were all the fountains of the great deep broken up, and the windows of heaven were opened.”—Genesis vii. 11.
- 12 ἐκ πέτρης.—The rocky crust of earth, with deep foundations and lofty mountains, and permeated with water from top to base.
- 15 δεκάτῃ.—The ancients believed in a general renovation of the surface of land and water upon our globe at the end of every ten thousand years or so, this period being half of their *magnus*

annus, or Great Platonic Cycle. For nine (έννέα) of those thousands would the aqueous vapour roll round our planet, replenishing the rivers, lakes, and springs that finally empty into the ocean; and during the same nine periods would one branch of this ocean river, namely the underground water, trickle from the surface downwards through the rocky envelope of earth. The tenth (δεκάτη) period would be the fateful one, since the entire configuration of land and water would be altered by seismic, volcanic, depressing, and elevating influences. A somewhat analogous theory is held by modern writers to account for the long periods of cold (similar to the historic Ice Age), and equally long of heat, which occurred at widely separated intervals during the history of our Earth. Dr. Croll ascribes the cause to the combined effect of change of eccentricity and the precession of the equinoxes,—the *magnus annus* of the ancients,—and while arguing that the northern hemisphere was glaciated while the southern was warm, and vice versa, says, “owing to the precession of the equinoxes, the condition of things on the two hemispheres must be reversed every 10,000 years or so.”

16-17.—The context, as well as the μὲν—δὲ (line 18) shows that the overground circulation of aqueous vapour as a whole (ἱερός ποταμός Ὀκεανός) is referred to in these lines, just as line 18 has reference to the underground water.

18 μέγα πῆμα.—It is generally conceded that the descent of water from the surface is an essential exciting cause of volcanic outbursts, landslips, and possibly of earthquakes. The scourging effects of volcanoes and earthquakes are well known. In 1806 a landslip in Switzerland swept across the valley of Goldau, burying four villages and about 500 people. In 1839 a mass of chalk on the Dorsetshire coast of England slipped into the sea, bearing with it houses, roads, and fields, and leaving behind a rent three-quarters of a mile long, 150 feet deep, and 240 feet wide.

19 τὴν ἐπίορκον.—The ἐπί follows its case, the reading being τὴν ἐπὶ ὄρκον.

Every particle of matter has its own station to guard and its own function to fulfil. If it proves untrue to duty, and leaves behind the bond of union (ὄρκον ἀπολείψας) for the sake of this (τὴν ἐπὶ) underrunning water, it will assuredly rue the day. The poet tells us how; and modern science thus confirms his words:

“The great plains of the earth’s surface are due to the deposit of gravel, sand, and loam. They are thus monuments at once of the destructive and reproductive processes which have been in progress unceasingly since the first land rose above the sea and the first shower of rain fell. Every pebble

and particle of their soil, once part of the distant mountains, has travelled slowly and fitfully downwards. Again and again have these materials been shifted, ever moving downward and sea-ward. For centuries, perhaps, they have taken their share in the fertility of the plains, and have ministered to the necessities of flower and tree, of the bird of the air, the beast of the field, and of man himself. But their destiny is still the great ocean. In that bourne alone can they find undisturbed repose, and there slowly accumulating in massive beds, they will remain until, in the course of ages, renewed upheaval shall raise them into future land, there once more to pass through the same cycle of change."—*Encyc. Brit.*

CHAPTER V.

SECT. 1.—CŒUS, THE TIE OF UNION.

Cœus.—There is another characteristic as indelibly associated with matter as is Order. Mere arrangement of atomic matter would still leave matter as atomic, and an Earth composed of individual atoms, however often and variously permutations might occur among them, would be but very little more advanced in evolution than purely nebulous matter itself. To continue moving on the lines of progress, it was necessary for atomic matter to be endowed with Union. "In union there is strength," and a stable crust for our globe was all essential to its future development.

There are many shades of union, from that of mere coalescence or coition to that exhibited in our most stable compounds. And by compound we do not mean here those substances evolved through chemical agency and in which a total change of properties takes place, such as have been mentioned under the Cyclopes. We mean those substances produced by the natural inclination of particles to cling to each other, and to thus make molecules from atoms, and masses from molecules, while each ingredient still retains its own properties.

This natural inclination or inherent property is called Cohesion or Adhesion: it is common to all matter, being strongest in the solids to which it gives their varying degrees of hardness, tenacity, elasticity, malleability, and ductility; in a less degree it is found in liquids; least of all in gaseous bodies, in which indeed so weak is it that it is said to be apparently absent. Now, whether we view this Cohesion as exhibited in the hardest of our sedimentary rocks, in the sturdy oak, and healthy animal body,—or in

its weaker form, as in water, where the association of parts but enables the particles to roll over other particles,—or in its still weaker condition, where, as in air, there is but seen a mixture or diffusion,—we find one resemblance, namely, a mingling or mixture of the ingredients, a condition or state in which different constituents are blended in common. If we hunt down such evolved words from union, as cohesion, mixture, association, society, and their offshoots, we shall bring them finally to bay when we arrive at the notion of “common”; and communion, community, commonweal, common woe, common lot, and many other compounds of “common” bear witness to the assertion. Radicals are to language what the nebulous period is to time, the beginning of all, misty and uncertain in their application, and a basis for word-spinning. In dealing with the nebulous past it is to those radicals we must look for light; and in this particular case, it will be found that the idea of *Common* must be taken when considering the Titan *Cœus*.

The word *Koîos* is but *koinós* “common,” the *ν* being omitted, as we see in *μύδος* for *μυνδός*, *ἄχος* and *ἄχυνός*, *εῤῥήμιος* and *ἐρεμνός*; and *κοινώω* is used in the New Testament to signify “to defile, or pollute,” from the notion of “promiscuousness” as associated with things in common. Our own “cohesion” is a relic of this *Cœus*. In *Chaos*, which was but a state of “oneness,” we do not expect to find a *Cœus* or commonness. But when disruption was accomplished, when the oneness was put an end to, then we would have a condition favourable to the assemblage of things in common, and it was, accordingly, at that period of existence that our Titan came into being. This state of things would continue and be more intensified when, later on, we come to a time, already mentioned, that presents to view a midway region confined by the firmament above and by a fluid igneous orb below. This region contained the *semina rerum*, the seeds of all things that make up water, air, and earth. All these, however scattered and apart originally, must have gradually mingled and been drawn closer together to form a vaporous, heated, acrid, atmosphere of

their own, must have participated in storms and convulsions of their own that confounded and mingled together the nebulous layers, the heavy and the light, the moist and the dry. A condition of *commonness* would thus of necessity be produced, a commonness that implied but mere coition, it is true; still, it was the nebulous parent of a more evolved cohesion that was to be.

Namque canebat uti magnum per inane coacta
Semina terrarumque, animæque, marisque fuissent,
Et liquidi simul ignis: ut his exordia primis
Omnia, et ipse tener mundi concreverit orbis.

Virg. Ecl. VI. 31.

But though an improvement on pre-existence, this loose gathering of matter was not sufficient. A crust *on* earth and an atmosphere *above* earth were fore-ordained, and such could be accomplished only by some agency that would purify the promiscuous mass in translating the *semina rerum* to their proper sphere, the orb below. Mythology provides such agency.

Φοίβη δ' αὖ Κοίου πολυήρατον ἦλθεν ἐς εὐνὴν.—Theog. 404.

This purifying agent or Phœbe, (φοῖβος, bright, pure), that came to the exalted region where promiscuous matter awaited her, is more likely to have been the deity, and not Apollo, whom Horace invokes in the first line of his *Carmen Sæculare*:

Phœbe silvarumque potius Diana,
Lucidum cœli decus, o colendi
Semper et culti, date, quæ precamur.

Considering the ostensible purpose for which the famous Ode was written, and the real purpose in the mind of him who penned it, how better could the poet commence than by invoking *Purity* in conjunction with the *Chastity of Secluded Nature*?

How would this promiscuous assemblage of all things become purified, and what would follow?

So long as no water fell, so long would the common condition remain; but with the onset of the rain, a new period in the evolution of our sphere began, and change

after change occurred in the regions below and in those above:—

1. The falling rain, no matter how long resisted by the intense heat of the fiery orb beneath, would finally establish a world of waters or “thermal ocean” on the earth’s surface.
2. The metallic and earthy of the semina rerum, as being more dense, would be the first to fall from above with the downward rain. Again and again would they be hurled back with the rain when changed to steam by the heated surface; yet they constantly, like a quail in flight, kept getting closer and closer to the gradually cooling surface, and a time came at last when the vast pile of loose, unstable matter, purged from the quasi airy envelope of earth, and flying from the advances of the rain, would be plunged into the sea.
3. Thence they would fall as precipitates to the bottom, and in conjunction with the denudations and wear of the primal crust form the lowest strata of our aqueous rocks.

If we compare the myth of Asteria with the foregoing, we find the facts identical. *Asteria* (α στερεός), the “not solidified,” “the unstable,” who flying from the advances of Zeus, the life-giving rain, hovered, as a quail, over the expanse of sea, and plunged into its protecting depths, there to remain as “an island that had fallen from heaven like a star” (ἀστήρ),—and so “well-named,”—till *she rose above the surface*, to be termed indifferently *Asterie* or *Ortygia* (ὄρτο γῆ).

We shall have a good deal more to say regarding this *Asteria*; but we leave her for the present and turn to her sister *Leto*, or *Latona*:—

- 1 Φοίβη δ' αὖ Κοῖον πολυήρατον ἦλθεν ἐς εὐνὴν
κυσαμένη δὴ ἔπειτα θεὰ θεοῦ ἐν φιλότῃ
Λητῷ κυανόπεπλον ἐγείνατο, μείλιχον αἰεί,
ἥπιον ἀνθρώποισι καὶ ἀθανάτοισι θεοῖσι,
- 5 μείλιχον ἐξ ἀρχῆς, ἀγανώτατον ἐντὸς Ὀλύμπου.
γείνατο δ' Ἀστερίην εὐώνυμον, ἣν πότε Πέρσης
ἡγάγετ' ἐς μέγα δῶμα φίλην κεκλήσθαι ἄκοιτιν.—Theog. 404.

To the high couch of Cœus Phœbe came,
 And then in union with the god grown large
 The goddess bore Latona, the blue-robed,
 The ever balmy one, the ever mild
 For men and gods immortal ;—balmy aye,
 Least solid structure of th' Olympian realm.
 Asteria too, the well-named, she begot,
 Whom Perses once brought to his mansion great
 To be acclaimed his dear beloved spouse.

NOTES.

πολύηρατον—πολύς αἶρω.—The region *above* the earth, containing the semina rerum. There is an “airy” sound about the Greek word that savours of the nebulous.

5 ἀγανώτατον—ἄγανος (ἄγνυμι) “most liable to break,” hence, “least solid.” ἔντος we take as a substantive.

Apollodorus is more diffuse in the account :

τῶν δὲ Κοίου θυγατέρων Ἀστερία μὲν ὁμοιωθεῖσα
 ὄρνυμι εἰαυτὴν εἰς θάλασσαν ἔρριψε, φεύγουσα τὴν πρὸς
 Δία στήνουσίαν· καὶ πόλις ἀπ' ἐκείνης Ἀστερία πρῶτον
 κληθεῖσα, ὕστερον δὲ Δῆλος. Δητῶ δὲ συνελθοῦσα
 Διὶ κατὰ τὴν γῆν ἅπασαν ὑφ' Ἡρας ἡλαύνετο, μέχρις
 εἰς Δῆλον ἐλθοῦσα γεννᾷ πρῶτην Ἀρτεμιν, ὑφ' ἧς
 μαιωθεῖσα ὕστερον Ἀπόλλωνα ἐγέννησεν.—1. 4.

SECT. 2.—OUR ATMOSPHERE.

Latona.—Let us anticipate somewhat by saying that Leto, the Roman Latona, is the personification of our *Atmosphere*.

A curious combination is this atmosphere of ours. It is material, common to all substances, highly elastic, essential to life; and, though invisible in small quantities, in large masses it is blue, and imparts this blueness to objects seen through it.

This description tallies with that given by Hesiod ;—Leto, daughter of Cœus or Commonness, least solid of all structures, ever mild for men and gods, the blue-robed one.

It is composed principally of Nitrogen and Oxygen in the ratio of 4 to 1, and though it surrounds our globe to a

distance of 50 miles and further, yet those gases form no chemical compound in the air : the Nitrogen and Oxygen remain a mere mechanical mixture, as distinct from one another as a mixture of sand and sugar in a barrel. Why this is so we know not : neither do we well understand how our atmosphere came to settle round the globe, the general conjecture being that it somehow originated in the caverns of the earth, whence it eventually found egress. Whether this supposition be deduced from scientific data, or whether it be a dim relic of ancient lore, we cannot say, but it sounds suspiciously like that portion of the Myth which says, "Leto was prosecuted by Juno through the entire world." One thing is clear ; that our information as to the genesis of the atmosphere is far from complete, and the late discovery in it of a new element, Argon, throws doubt on our exact knowledge even of its constituents. The same lack of full information is stated in the classics. Thus Ovid in VI. 319, of his *Metamorphoses* says :—

Res obscura quidem est ignobilitate virorum,
Mira tamen.

But whatever uncertainty there may be through our *ignobilitas* with regard to the exact formation and appearance of an atmosphere, there appears to be very little doubt as to the main point at issue, namely, that Leto is its mythical personification. All things, earthy, fluid, and gaseous, were bound together loosely in Cœus till Phœbe came to purify the exalted couch on which he lay. And when the grosser elements were purged and fled before the rain to plunge themselves into the sea, what would betide the more volatile, the Nitrogen and Oxygen that are the main components of atmospheric air ? Some portion would be washed down by the rain and fall to the depths of ocean, entangled in the earthy and metallic elements ; another portion might rest over the surface of the deep, and be prevented by the intense heat from mingling in the requisite proportion ; still a third may have been left higher up, but so vitiated by other gases as to be almost useless for a life-supporting medium. It would thus, as Mythology says, be

debarred as it were from all regions ; be the “ *exul mundi*,” “ *Earth’s Vagrant*,” as Ovid makes Niobe contemptuously style Latona.

In the meanwhile precipitation, denudation, and disintegration were going on in and at the bottom of the sea, and the first stratified rocks would appear in time above the surface, to take on additional cohesiveness when raised above the waters. This cohesion would be at the expense of porosity, and the particles of air and water elements bubbling from the baked backs of the sand and mud banks would seem to offer a refuge for our atmosphere. Only a seeming one, however, as the heat would of itself debar any permanent mixture of the elements, especially of such a one as Nitrogen, so remarkable for the instability of its compounds that it has been likened to a “ half reclaimed gypsy from the wilds.” The refuge would be but temporary at best, as these Ortygian islands, succumbing to the onsets of fire below and water above, would quickly be swallowed in the ocean depths, and compel our atmospheric elements to be exiled once and again. This condition of instability in early land-making is well recognised in treatises on geology, and subsisted more or less up to Carboniferous times. Silurian land-making resembled so much the accumulations of sand thrown upon our beaches by the sea waves that Agassiz remarks of it: “ In the Silurian period, the world, so far as it was raised above the ocean, was a beach.” Of the Devonian, Hugh Miller writes thus:—“ Over dark and shallow seas mud-banks of vast extent occasionally raised their flat, dingy backs, and remained hardening in the hot sun until their oozy surfaces had cracked and warped, and become hard as the sun-baked brick of Eastern countries ; and then, ere the seeds of terrestrial plants, floated from some distant inland, or wafted in the air, had found time to strike root into the crevices of the soil, some of the frequent earth-tremors of the age shook the flat expanse under the water out of which it had arisen, and the waves rippled over it as before.”

And so it would go on through the ages till such time as some land area would emerge, more cohesive in its structure, and more strengthened in its base by the protozoans of early life. All elevated land areas before this would be Asterias or Ortygias, marked by instability and mere visibility : this would be the *Delos*, the permanently visible, the *certain*, anchored in the ocean by the foraminifers and the corals of Zeus or life : in this stable location would the Atmosphere find a secure abiding place wherein to gather its forces and bring forth those agencies whereby we are afforded the direct and reflected light and heat of the Sun. This once achieved, vegetable life that takes in carbonic acid and exhales the oxygen would accomplish the rest,—as it did in the carboniferous Era, would purify the air, give fresh sustenance to the atmosphere, and establish a medium suited to the wants of a life more evolved than the fish and mollusk of Devonian and Silurian Days.

The derivation assigned Leto ($\lambda\eta\theta\omega$, to lie hid, to be unseen), is suitable enough to our atmosphere, considering our lack of knowledge with regard to it in many points, its own invisibility, and its being a common medium wherein *lie hid* the volatile portions of water, earth, and organic life, the perfume of the rose as well as the germs of disease, the effluvia of electricity, the rays of light, and the flame that goeth upwards.

When was atmospheric air well established round our globe? Every treatise on geology states that the atmosphere of the early ages was very different from that of to-day. Miller says of the Azoic Age, “A continuous stratum of steam, then, that attained to the height of even our present atmosphere, would wrap up the earth in a darkness gross and palpable as that of Egypt of old—a darkness through which even a single ray of light would fail to penetrate.”

Layers of dank, dense vapour—pierced occasionally, it may be, by a few straggling wisps of palest sunshine—characterised the atmosphere of Silurian and Devonian

times. When we come to the Carboniferous Era, the air was so loaded, it is supposed, with carbonic acid that, to use the language of Winchell, "No air-breathing animal could survive, and Nature was called upon to solve the problem of the elimination of the noxious gas which unfitted the atmosphere for respiration."

The problem was solved by the vegetation of immense size and universal extent which characterised the period, and which by absorbing the superfluity of carbonic acid from the air helped to purify it and render respiration possible.

Not, then, till the end or towards the end of the Carboniferous Age can it be said that an atmosphere existed similar in a measure to our own in ingredients, proportion, and respirable qualities.

This is conjectural science, as we find it in the text-books: yet, when we turn to the Myths, we find much to verify such conjectural conclusion.

The words of Apollodorus in regard to Asteria and Leto have some significance: "*ἐαυτὴν εἰς θάλασσαν ἔρριψε*" point to the atmosphere not being matured till after the "thermal ocean" was formed and more or less permanently solid land had been thrust above the waters.

We gain further information from Ovid who devotes much space to Latona. Having related how the arrogance of Niobe towards Latona was punished by Apollo and Diana at the entreaty of their mother, the poet takes a retrospective view and describes the wanderings, sufferings, and final triumph of the atmosphere personified.

We shall understand the poet better by entering into his plot. He goes back in thought to the day when the Glacial period had passed, and when nature donned once more its garb of green. He introduces a denizen of Post-tertiary times, possibly the humble fern, as relating to its fellow companions of the wood the incidents which it, or its type, had witnessed in the early and closing periods of the Carboniferous Age, and how the atmosphere was affected thereby.

- 1 Tunc verò cuncti manifestam Numinis iram
 Fœmina virque timent : cultuque impensius omnes
 Magna gemelliparæ venerantur numina Divæ.
 Utque fit, à facto propiore priora renarrant.
- 5 E quibus unus ait : Lyciæ quoque fertilis agris
 Haud impunè Deam veteres sprevere coloni.
 Res obscura quidem est ignobilitate virorum ;
 Mira tamen : vidi præsens stagnumque lacumque
 Prodigio notum. Nam me jam grandior ævo,
- 10 Impatiensque viæ genitor, deducere lectos
 Jusserat indè boves ; gentisque illius eunti
 Ipse ducem dederat : cum quo dum pascua lustrò,
 Ecce ! lacus medio, sacrorum nigra favilla,
 Ara vetus stabat, tremulis circumdata cannis.
- 15 Restitit : et pavido, Faveas mihi, murmure dixit
 Dux meus : et simili, Faveas, ego murmure dixi.
 Naiadum, Faunine foret tamen ara rogabam,
 Indigenæne Dei ? Cùm talia reddidit hospes.
 Non hâc, ô juvenis, montanum Numen in arâ est :
- 20 Illa suam vocat hanc, cui quondam regia Juno
 Orbe interdixit : quam vix erratica Delos
 Orantem accepit, tunc cùm levis insula nabat.
 Illic incumbens cùm Palladis arbore palmæ,
 Edidit invitâ geminos Latona nevercâ.
- 25 Hinc quoque Junonem fugisse puerpera fertur,
 Inque suo portâsse sinu duo Numina natos.
- Jamque Chimæerifæræ, cùm Sol gravis ureret arva,
 Finibus in Lyciæ, longo Dea fessa labore,
 Sidereo siccata sitim collegit ab æstu,
- 30 Uberaque ebiberant avidi lactantia nati.
 Fortè lacum melioris aquæ prospexit in imis
 Vallibus : agrestes illic fruticosa legebant
 Vimina cum juncis, gratamque paludibus ulvam.
 Accessit, positaque genu Titania terram
- 35 Pressit, ut hauriret gelidos potura liquores :
 Rustica turba vetant. Dea sic affata vetantes,
 Quid prohibetis aquis ? Usus communis aquarum.
 Nec solem proprium Natura, nec aëra fecit,
 Nec tenues undas. Ad publica munera veni.
- 40 Quæ tamen ut detis, supplex peto. Non ego nostros
 Abluere hîc artus, lassataque membra parabam :
 Sed relevare sitim. Caret os humore loquentis ;
 Et fauces arent ; vixque est via vocis in illis.
 Haustus aquæ mihi nectar erit ; vitamque fatebor
- 45 Accepisse simul : vitam dederitis in undâ.
 Hi quoque vos moveant, qui nostro brachia tendunt
 Parva sinu. Et casu tendebant brachia nati.

- Quem non blanda Deæ potuissent verba movere?
 Hi tamen orantem perstant prohibere, minasque,
 50 Ni procùl abscedat, conviciaque insuper addunt:
 Nec satis hoc. Ipsos etiam pedibusque manuque
 Turbavère lacus: imoque è gurgite mollem
 Huc illuc limum saltu movère maligno.
 Distulit ira sitim. Neque enim jam filia Cœi
 55 Supplicat indignis; nec dicere sustinet ultrà
 Verba minora Deâ; tollensque ad sidera palmas,
 Æternum stagno, dixit, vivatis in isto!
- Eveniunt optata Deæ. Juvat isse sub undas;
 Et modò tota cavâ submergere membra palude
 60 Nunc proferre caput: summo modò gurgite nare:
 Sæpe super ripam stagni considerare: sæpe
 In gelidos resilire lacus. Sed nunc quoque turpes
 Litibus exercent linguas: pulsoque pudore,
 Quamvis sint sub aquâ, sub aquâ maledicere tentant.
 65 Vox quoque jam rauca est; inflataque colla tumescunt,
 Ipsaque dilatant patulos convicia rictus.
 Terga caput tangunt; colla intercepta videntur;
 Spina viret: venter, pars maxima corporis, albet;
 Limosoque novæ saliunt in gurgite ranæ.

Met. VI. 313—381.

Then fear they all, of either sex, the wrath
 Made manifest of the divinity;
 And all by garb more zealously respect
 The twin-bearing deity's controlling means.
 And as it haps, from later incident
 They hearken back to those done long before.

Of whom one thus: "With rue the settlers old
 In fertile Lycia's fields this goddess scorned.
 Not clear the subject through man's ignorance;
 Yet wondrous 'tis: a witness I have seen
 The marsh and lake for strange event renowned:
 For me our sire, now older grown in years
 And for the way incapable, ordained
 To carry down from there the oxen choice;
 And gave me going guide of his own stock:
 With whom while I traverse the sedgy plains,
 Behold! amid the lake, and black with ash
 Of sacred rites, a hoary temple stood
 Begirt with rustling canes. Paused then my guide
 And said with trembling accent, 'Favour me!'
 And 'Favour me!' with accent like I said.
 When asked I if, howbeit, this were shrine
 Of Naiads, Faun, or country born god,

My comrade friend made answer thus : ' O youth,
 No mountain deity is in this shrine :
 Her own does this she call whom Juno proud
 In time past from this orb debarred : and whom
 Imploring, wandering Delos scarce received
 When erst it floated, an unstable isle.
 Incumbent there on palm with wisdom's tree
 Latona brought forth twins, their stepdame loath.
 Here too she's said, delivered, to have fled
 From Juno, and have carried on her breast
 The two divinities, her offspring born.

And now in Lycia's climacteric bounds,
 When mighty Sol should search with heat the plains,
 The goddess wearied by her longsome toil,
 Parched by the iron surge grew thirst, and dry
 The milk-paps had her eager children drained.
 Amidst the lowest vales she spied by chance
 A lake of purer water : there did roam
 The country's dwellers through the shrubby plains,
 Osiers with reeds and sedge for marshes suit.
 The Titan born approached and pressed the earth
 With bended knee, that fain to drink she might
 The waters cool : the rustic crowd say nay.
 Them saying nay the goddess thus addressed :
 ' Why bar me from the waters ? Common is
 The waters' use. Nor sun particular,
 Nor yet the air, nor yet the waters thin,
 Has Nature formed. To public gifts I've come.
 Which yet that ye may give I humbly pray.
 Not here to bathe our limbs and wearied frame
 Was I preparing : only thirst to ease.
 The mouth of aught conversing moisture lacks,
 The throat is parched, it scarce has way for sound.
 A draught of water nectar I shall find ;
 And own that life has likewise been received,—
 The life ye may have given in the wave.
 Let these, too, move you, who upon our breast
 Their little arms extend.' And, as by chance,
 Her offspring young extending were their arms.
 Whom would the deity's sweet words not move ?
 Yet those persist the suppliant to bar,
 And threats and scurrile croaks moreover add
 Should she not far retire. Nor this the end.
 Them, feet and hands alike, the lakes engulfed ;
 And they, in their convulsive struggling, stirred
 The mud on all sides from the depth below.
 Such wrath as this the raging drought dispelled.

For now no more the child of Cœus woos
Unworthy beings : and no longer brooks
To utter words unmeet for deity.
And lifting to the stars her palms she said,
'In this stagnation may ye dwell for aye !'

The wishes of the goddess come to pass.
It boots that they have gone beneath the waves ;
And sometimes in a hollowed marsh to sink
Their limbs entire, anon to raise the head ;
To sometime swim on surface of the pool ;
To often squat upon the marsh's bank ;
To oft leap back into the waters cool.

But even now those filthy tongues they use
In times of rest : and void of shame they try
Though 'neath the wave, beneath the wave to croak.
E'en now their voice is harsh, and puffed up necks
They swell, and croaks dilate their gaping jaws.
Head touches back ; the necks are seen between ;
The back-bone greenish is ; th' abdomen too,
By far their body's greater part, is white ;
As frogs, they jump anew in slimy pool."

NOTES.

- 2 cultu.—The snow and ice of the glacial age, symbolised by Niobe, had gone under the influence of the heat and light, the offspring of the atmosphere. As a consequence, vegetation began once more to deck itself in green.
- 3 numina.—The *influences* of the atmosphere in reflecting *light* and *heat*.
- 4 priora renarrant.—This shows that the scientific fact represented by Niobe was *posterior* to the circumstances about to be related.
- 5 E quibus unus ait.—The "fern" loquitur.
Lyciæ.—λευκός, "light, clear," as the atmosphere began to be in carboniferous times. The ancient name of Lyciæ was Μελύς, where the *black* (μέλας) colour of the coal-fields is pointed out. The epithet fertilis, added to Lyciæ, denotes the excessive vegetation and growth of the period.
- 8 stagnumque lacumque.—The vegetation that formed coal was, for the most part, a swampy growth.
- 10 genitor.—The vegetable race must have had *an ancestor*, the first of its kind, who in Carboniferous time would certainly be "grandior ævi, impatientiusque viæ."
- 11 boves.—It is quite a common simile with the classic poets to compare the lands submerged or emerged in the early ages of the earth to *cattle* : they pictured them, when above the waters, as

oxen grazing ; and when submerged, as oxen brought to their stalls. Thus Geryon's oxen were the germs of continental areas raised up by Herculean force, and the oxen of Juno were the plateaux and mountains raised above the earth's surface.

In no other age were alternate subsidence and elevation of land so marked as in the Carboniferous. When the growth and decay of luxuriant vegetation had so accumulated as to form a bed of varying thickness, subsidence ensued, and under the water and under the detritus brought on by the water, those beds were transformed into coal by heat, moisture, and pressure. Later on, those beds with the *débris* upon them were raised to the surface, assumed a swampy nature, and were again filled with the luxurious vegetation requisite to form another bed of coal,—to sink again, and have the same process repeated. Ovid has pictured the whole process briefly and concisely in "*deducere lectos boves*," and the use of *lectos*, as capable of being applied to "beds" or "layers," is significative.

- 12 *ducem*.—Perhaps one of the algæ or fucoids, among the earliest forms of vegetable life.
- pascua*.—The fern and its companion appeared above the waters in the midst of a *swamp*.
- 14 *ara vetus*.—The solid land, "the old sod," elevated enough to be distinguished from the swamps and marshes hard by, and *black* with the convulsions of past ages, and of coal-making periods.
- cannis*.—Many of the carboniferous trees, especially the calamites, resembled our cane trees, having a hollow, jointed stem, and longitudinal striations : they were from 20 to 40 feet high, and may well be described as *tremulis*.
- 15 *restitit*.—Both fern and fucoid had originally appeared in a swampy tract beyond the confines of the more solid and elevated island (*pascua lustrum*). They now approached this *ara vetus*, as being better suited for their growth and requirements.
- 19 *Juvenis*.—The carboniferous fern was but a youth in the eyes of the Silurian fucoid.

Vast platforms, swampy for the most part, were the characteristics of Carboniferous time : there were no mountain ranges (*non montanum numen*).

- 23 *Palladis arbore palmæ*.—The palm and olive, types of the endogens and exogens that were yet to be, were still *germinally below* : hence the use of *incumbens*. Endogens have been found in Devonian times, and fragments of what Dr. Dawson has likened to dicotyledinous wood.
- 24 *invitâ novercâ*.—The dry land, Juno, was not yet well prepared for higher forms of life, and for a light and heat giving atmosphere that was requisite for such forms.
- 26 *portâsse sinu*.—The atmosphere, though possessed of light and

heat giving qualities from an early period, was forced to keep them latent till a more suitable age appeared.

- 27 Jamque.—The *dux*, fucoid, may be considered as closing its relation of past events with the words "*numina natos*." The fern now proceeds to tell what it had witnessed for itself. The fucoid's story has reference to all before Carboniferous time; the fern's to Carboniferous time itself, and probably its close.

Chimærifera.—Chimæra, as already mentioned, means a long degree of heated temperature.

The belief among the ancients, and among many modern writers, Dr. Croll for instance, is that our Earth in early ages went through a succession of hot and cold periods, lasting for about 10,000 years, the half of the *magnus annus*, or Platonic year,—or of the cycle produced by the Precession of the Equinoxes.

The words "*cum Sol gravis ureret arva*" show that the climatic condition at the period denoted by "Jamque" was tropical throughout; as indeed it is asserted to be in Carboniferous time, in our geological treatises.

- 29 sidero.—Ovid Latinises the Greek word *σιδήρεος*, "iron," just as Pliny uses *siderites* for the loadstone, that draws iron. The long *ē* does not affect the scansion, as *eo* can be taken as one syllable.

The coal measures are intercalated everywhere with strata of shale in which beds of iron are always found associated. The New Red Sandstone group, overlying the Carboniferous, owes its colour to the presence of ferruginous matter, oxide of iron. On the stagnant water of marshes, bogs, pools, &c. we see an iridescent scum: this has been produced by alternate changes of peroxide to protoxide and protoxide to peroxide of iron, thus causing a constant interchange of the life-giving element, oxygen, and the *sidero æstu* of the poet.

- 31 lacum melioris aquæ.—Marine shells found lying on the coal bed or its attached shales show that a portion of the vegetation which formed the coal flourished in salt or brackish water. But other portions flourished in bitter or fresh water. "Some of the coal measures are of fresh water origin, and many have been formed in lakes; others seem to have been deposited in estuaries, or at the mouths of rivers, in spaces alternately occupied by fresh and salt water."—*Lyell*.

- 33 The whole line describes well the Carboniferous flora.

- 36 vetant.—The denizens of the period, cold-blooded animals, did not want a better atmosphere

- 42 caret os humore loquentis.—The atmosphere is requisite for the proper production of sound or speech.

Dana, writing of the Carboniferous Age, says, "There was no music in the groves, save, perhaps, that of insect life and the croaking Batrachian."

- 44 vitam.—Oxygen is the life-giving principle.
 47 Et casu.—A stray gleam or two of pale sunshine may have occasionally pierced the dense air of those days.
 49 Hi.—The agrestes mentioned in line 32.

In the Carboniferous Age purely air-breathing animals could not exist, owing to the excessive amount of carbonic acid in the air, and animal life was represented chiefly by fishes and such cold-blooded animals as do not require much oxygen. But all through this Coal Age and extending into the Triassic are found the remains and tracks of a supposed amphibian, called the Labyrinthodont, or Cheirotherium, from the likeness of its tracks to those of an open hand. Some class it as a marsupial, but the general opinion is that it was a batrachian. It measured from 7 or 8 feet to as many inches long. The larger specimens are thus described by Hooker: "Though having a head of three or four feet in length, and teeth three inches long, and being about the size of an ox, with his long hind legs, he was very much like a frog."

- 51 pedibusque manue.—The peculiar marks of the Labyrinthodonts or Cheirotheria are noted.

One of nature's convulsions, so common in Carboniferous times, occurred, with the usual result of submergence for land and life.

- 54 Distulit ira sitim.—Platform after platform went down, freighted with the carbonic acid which vegetation had taken from the air. The atmosphere was consequently purified, and we find such air-breathing animals as reptiles, monstrous birds, and marsupials appearing in the Mesozoic Age that followed the Carboniferous.

- 54 Neque enim jam.—The "fern" breaks off his narrative for a while to laud the greater intelligence of those who were fortunate enough to live with it in Post-tertiary days. It says in effect, "Look around on the fauna and flora of our days; they are *not unworthy* of a beneficial atmosphere. Listen to the chirpings and the songs of birds, the lordly roaring and bellowing of the animals, &c.: such sounds, more or less articulate, are the only ones pleasing to the deity of the atmosphere."

- 55 dicere sustinet.—It is the air that proclaims sounds and speech. No air, no sound.

- 56 Tollensque.—The "fern" resumes the thread of its narrative; and proceeds to describe the change or evolution of the Carboniferous Cheirotheria into Post-tertiary frogs.

- 58 Juvat.—Better in evolution is a frog than a Cheirotherium.

- 63 Litibus.—Frogs are loudest in their croaking on *stilly* evenings. This is not the first time Ovid has Latinised the Greek *λερός*, "plain, simple." See his description of the Chaos.

While Apollo and Diana are not within the direct scope of this work, yet a few words may be spared them, and may not be amiss. As children of Latona, it is evident that their origin must be traced to what Latona represents, viz. : our atmosphere. Both are described as deities who punish, and send plagues, pestilence and death on men and animals ; also as divinities who help, save, and ward off evils from living beings.

These seemingly contradictory attributes are reconciled when we remember that atmospheric agencies are *constructive* and *destructive* ; that the atmosphere is not only a source of health and well-being, but also an agent which rusts and corrodes and introduces blight, plague, and germinal diseases on all organisms alike, animal and vegetable. The *ἀγὰν βέλεα* of Apollo and Diana would consequently be tantamount to natural deaths from *apnœa*, as in pleurisy, phthisis, and such other diseases, as opposed to death from violence.

As both sound and solar light and heat are dependent on a medium for the vibrations so all-essential for their production, and as this medium is our atmosphere, it is evident how dependent on this atmospheric agency is life with all its civilisation ; how dependent on it are the gifts of speech, song, and music. It is thus that Apollo is said to be the founder of cities and of civilisation, as also the god of prophecy, music, and song.

The permanence of the atmosphere it is that produces all the uniformity of sound. Change its stability, and sound grows fainter until silence ensues ; change its proportions, and discord takes the place of harmony.

But light, heat, and sound are not only transmitted in direct lines, but also *indirectly*, through reflection. Diana is the deity who presides over such subtle agents ; she is peculiarly the goddess of the chase or hunting ; and reflected light, reflected heat, and reflected sound are nothing but light chasing light, heat chasing heat, and sound chasing sound—the Triformis Diana of the myths. She is never connected with prophecy, song, or music, like Apollo, since

grave speech and musical sounds are produce by *direct*, not indirect vibrations. She has been often confounded with Luna, as has Apollo with Helios, owing probably to the close connection between those light-giving deities and the light-manifesting ones. But if we bear in mind that Apollo represents the *direct agency* of the atmosphere in transmitting light, heat, and sound,—and Diana, the *indirect agency* of the atmosphere in reflecting the same, we can never fall into such confusion.

Apollodorus, describing the accouchement of Latona, says “she begot first Artemis; besought by her, she then begot Apollo.” It is another bit of condensed science, implying as it does that we see the *reflected* or *refracted* light of the sun before his *direct* rays are actually visible.

SECT. 3.—THE METAMORPHIC ROCKS.

Let us now go back to Asteria.

Asteria.—The rocks of our globe have been classified as Fossiliferous, Metamorphic, Volcanic, and Plutonic. Of these the latter two are universally conceded to be the products of igneous action, and the first or fossiliferous, of watery action. But the same unanimity of opinion does not exist as to the origin of the Metamorphic. They form a huge mass of not less than 30,000 feet in thickness, at the least, have the plutonic granite for a basis and the fossiliferous for a canopy, and consist of varying combinations of quartz, feldspar, mica, hornblende, chlorite, limestone, &c., so as to form the Gneiss and other rocks called by the general name of Schists, from their natural tendency to fissility. They are all crystalline in structure and devoid of fossils: in these respects they resemble the granite on which they rest, and differ from those above them. They are also foliated or stratified in arrangement: in this they resemble the rocks above them and differ from the amorphous granite. Hence the doubt and dispute that have arisen as to their origin. Are those Metamorphic rocks the result of fire, like the granite; or of water, like the sedimentary?

Many things combine to eliminate the first or igneous mode of origin: the foliated arrangement cannot well be accounted for under such a theory, while, on the contrary, the crystalline structure can result from changes brought to bear on sedimentary rocks under heat, water, pressure, and introduced gases; all which conditions were pre-eminently present at the time when the Schists were formed, and would not alone give them a crystalline texture but would also destroy all vestiges of fossil remains, supposing such to have existed.

The aqueous origin has proved more acceptable to most writers on geology, and has given rise to two theories. Some, following the "Neptunian" theory of Werner, contend that the "thermal ocean" of our early globe was loaded with mineral matter of all kinds, and that the Schistose rocks are chemically formed sediments or precipitates from this ocean: that the crystalline texture was gained *in* the waters before the particles subsided to the bottom, and that all subsequent changes were merely molecular or re-actionary.

Others maintain that the Schists were originally sedimentary, and derived partly from disintegration of the pre-existing granitic crust below or above the surface of the ocean, and partly from chemical precipitates; that those mechanical and chemical accumulations, strewed over the ocean's bed in coarse or fine debris, would then be subjected to the great internal heat of the earth, be more or less fused and rearranged, and would thus under heat, water, pressure, and escaping gases, be finally transformed into what are called altered or Metamorphic rocks.

Whichever of those theories be preferred, it is evident that the precipitation of chemically formed sediment is one of the important factors to be considered, since both sides allow its presence, one to a very large extent, the other in an inferior degree. This importance will be increased by the proportion of precipitated matter.

Who can tell the comparative proportions of denuded granite and of chemical sediments that formed those

Schists? All the waters of our oceans came confessedly from above. How much of the solid crust came from the same source?

That the *extent* of the original matter-bearing airy envelope was immense is granted by such writers as descant upon the topic. "It doubtless reached the moon," says Figuier in his "World before the Deluge." That the *quantity* of rocky material held by it in a gaseous form was also immense can be gathered from the same writer who says that it held not only the components of all our oceans and our atmosphere, but also "vast quantities of mineral substances, metallic and earthy, reduced to the gaseous state, and maintained in that state by the temperature of the gigantic furnace. The metals, the chlorides—metallic, alkaline, and earthy,—the sulphurets, and even the earthy bases of silica, aluminum, and of lime,—all at this temperature would exist in a vapoury form in the atmosphere surrounding the primitive globe." Granting this, then, there would surely be enough of matter, when translated from aërial to watery regions, to form when precipitated the Schistose rocks, thick though they be.

The matter, source, and mutations of those Metamorphic rocks are embodied in the *Asteria* of the myths. Let us compare her story with that of the Schists. She was begotten in the lofty couch of Cœus, the promiscuous matter of air above; she was the sediment of this matter when purified by Phœbe; wooed by Jupiter Pluvius she fled from aërial homes above and plunged into the sea; there changed to a rock she remained long before emerging to the surface as an Ortygia or Delos.

More than this too. She is the same Asteria

Whom Perses once brought to his mansion great
To be acclaimed his dear beloved spouse.

We have met this Perses before. He is the son of Crius and Eurybia, and brother to Astræus and Pallas: he must, consequently, have some connection with the *course* and *order* of things. The name, Πέρσης, implies all that is common to πέρθω, πίμπρημι, πρήθω, and πρίω, all of which

resemble one another quite closely in their radical and the formation of a future and aorist tense: it therefore embodies the ideas of "destruction," "burning," "swelling out," and "severing."

Hesiod, as noticed, has characterised the three brothers expressively: "Astræus, mighty; Pallas, god of gods; and Perses, "ὅς καὶ πᾶσι μετέπρεπεν ἰδμοσύνησιν." What is this *ἰδμοσύνη*, peculiar to Perses, and in some way associated with Order or Arrangement? "Skill," or "craft," is the usually accepted rendering of the word; but the derivation, *ἰδμων συνίημι*, implies more—"the craft or knowledge of bringing together." Bringing what? Hesiod says, when speaking of the offspring of Phœbe:

Asteria too, the well-named, she begot,
Whom Perses once brought to his mansion great
To be acclaimed his dear beloved spouse.

It was Asteria, then, that Perses exercised his art on,—it was the mineral and earthy matter which "had fallen from heaven like a star," and had plunged into the sea, that Perses brought to his mansion great, and there impressed his subtle work on.

What was the nature of this work? If Asteria represent the mineral sedimentary of the Metamorphic rocks, what does Perses represent? The question is best answered by reflecting on the further change impressed on those rocks to make them what they are, Crystalline Schists. What the agency is that produces crystallisation in rock or gem is more or less mysterious. That the atoms of common carbon and of equally common quartz, alumina, silica, and lime, *have* been transformed respectively into the diamond, amethyst, sapphire, opal, and pearl, we know; but we do not know the precise manner nor agency whereby the wonderful transformation has been effected. So, too, we do not definitely understand the agency that has brought about the crystalline texture of those Metamorphic rocks. "The metamorphic theory," says Lyell, "does not require us to affirm that some contiguous mass of granite has been the altering power; but merely that an action, existing in

that interior of the earth at an unknown depth, whether thermal, electrical, or otherwise, analogous to that exerted near intruding masses of granite, has in the course of vast and indefinite periods, and when rising perhaps from a large heated surface, reduced strata thousands of yards thick to a state of semi-fusion, so that on cooling they have become crystalline, like gneiss."

But what we do know regarding the process is found to agree so closely with nomenclature and mythical narrative as to make it evident that *Perses* is the personification of *Crystallisation*.

A certain though unexplainable arrangement of parts, heat, a tendency to expansion, and cleavage, are the requisites of crystallisation: these four requisites are expressed by the origin and brotherhood of *Perses*, and by the *πύμπρημι*, "to burn," *πρήθω*, "to swell out," and *πρίω*, "to sever," that are discernible in the derivation. Matter and water are essential to crystallisation, and its most general mode of formation is by deposit from a solution: So, too, is *Perses* described as bringing an *Asteria*, who had plunged into the sea, to his great abode. What was this great abode? It could not be the sea itself, for the myth leads us to believe that *Perses* brought her *thence* to his great abode. Whither? The only answer is, to the *bed* of ocean, where the sedimentary matter, spread out and exposed to the *ἰδμοσύνη* of its subtle partner, was metamorphosed into the Crystalline Schists. It would consequently look as if the framers of mythology agreed with the "Neptunists" as regards the *origin* of the Metamorphic rocks, but with their opponents as regards the *changes* effected on them: the one side can claim *Asteria*; the other, *Perses*.

The 7th Ode of his 3rd Book is addressed by Horace to *Asterie*. The personages mentioned in it have so failed to be recognised that all commentators are forced to agree with the following remark of Orellius, "*Asterie, Gyges, Chloe, and Enipeus* are all imaginations of the poet's brain." Quite true; but the imaginations of the true poet, ancient or modern, are bred of reality. There must be a *theme* for

song, and the theme in this case was one of the geological mutations through which our earth has gone.

We have already seen how Ovid took advantage of Latona to describe some of the characteristics of the Carboniferous age. In the same fashion does Horace utilise Asteria to describe some traits of the Devonian period.

We must enter, of course, into the poet's conceit. Taking the well-established Asteria as the Metamorphic rocks from whose disintegration all our great sedimentary formations are really sprung, he pictures her as a mother weeping for the departure of each child according as it leaves her to go to the surface above. Calling the igneous force of the central fire, that lay beneath those altered rocks, by the name of Enipeus,—and the luxuriant vegetation of the Carboniferous age, that was yet to be, by the name of Chloe,—the poet transports himself in thought to the commencement of the Devonian formation, which he calls Gyges,—and then proceeds to evolve the phantoms of his intellectual knowledge.

1 Quid fles, Asterie, quem tibi candidi
Primo restituent vere Favonii
Thyna merce beatum,
Constantis juvenum fide,

5 Gygen? Ille Notis actus ad Oricum
Post insana Capræ sidera frigidas
Noctes non sine multis
Insomnis lacrimis agit.

Atqui sollicitæ nuntius hospitæ,
10 Suspirare Chloën et miseram tuis
Dicens ignibus uri,
Tentat mille vafer modis.

Ut Prætum mulier perfida credulum
Falsis impulerit criminibus nimis
15 Casto Bellerophonti
Maturare necem refert.

Narrat pcene datum Pelea Tartaro,
Magnessam Hippolyten dum fugit abstinens;
Et peccare docentes
20 Fallax historias movet.

Frustra : nam scopulis surdior Icari
 Voces audit adhuc integer. At tibi
 Ne vicinus Enipeus
 Plus justo placeat, cave ;

25 Quamvis non alius flectere equum sciens
 Æque conspicitur gramine Martio,
 Nec quisquam citus æque
 Tusco denatat alveo.

Prima nocte domum claude neque in vias
 30 Sub cantu querulæ despice tubiæ,
 Et te sæpe vocanti
 Duram difficilis mane.

Why, O Asterie, weepest thou for Gyges
 Young with assurance of a long existence,
 That zephyrs fair will in the early springtide
 Back to thee bring with finny ware rejoicing.
 Brought to the opening with his spots peculiar
 After the stars of Capra madly raging,
 Restless he hies through darkness that is chilling,
 Darkness that marked is by excessive moisture.

E'en so, the envoy of an anxious hostess,
 (Proving how Chloe eager is desirous,
 How she inflamed is wretchedly by thy fires),
 Cunning attacks him in a thousand fashions.

Tells he in story how a woman, lost for
 Love to all honour, by her false assertions
 Urged a confiding Prætus to prepare death
 For an exceeding rare Bellerophontes :

Mentions how Peleus, continently fleeing
 From the Magnessian Hippolyt, was given
 Almost to Hades : subtly does he alter
 Stories instructive, purposely to tempt him.

All unavailing ; deafer than Icarian
 Rocks does he listen, still is he uninjured.
 But for thyself, beware ! Let not Enipeus,
 Near as he is, be welcomed more than proper ;
 E'en though no other equally as skilled is
 Seen in the warring plain to bend the courser ;
 E'en though no other equally as swift is
 Seen to glide onwards in the fashioned channel.

Bar thou thy house with coming of the darkness ;
 When the pipe rumbles gaze not at its sounding
 Down on the causeways ; and to him that often
 Hardhearted calls thee, obdurate continue.

NOTES.

- 1-8 Lament not, O Metamorphic rocks, for the Devonian formation. When cyclical time will bring round the spring, then will the prodigal return, freighted with mollusks and crustaceans, with the ganoids and the placoids. But at present it is flushed with the confidence of youth, has all the world before it, and is heedless to appeals.

- 3 Thyna merce.—thynnus, “a tunny fish.” The Greek word is *θύννος* or *θύνος*, and the omission of a letter is as free to the Latin as to the Greek poet.

The fishes form the most remarkable feature of the Devonian period, so much so that it has been called “The age of fishes.”

- 4 constantis.—Literally, “a youth with the belief of being constant.” The Devonian rocks had just commenced their existence, and thought, poetically, that they would last for ever.

- 5 Gygen.—*γίγνομαι γῆ*, “earth-born,” as being derived from the disintegration of a previous formation.

notis.—Nota, “a mark, spot.” Each formation has its own characteristic marks, in addition to the stratified form which is common to all. So much has this been the case with the Devonian that it has been called “The old red sandstone,” from the abundance of such rocks in the formation. We ourselves use the word “sandy” to denote “speckled, or marked with spots.”

Oricum.—*ὥρικός*, “mature, in one’s prime, the first opening of a thing.” So we say “the prime of the moon,” to denote the new moon, when it first appears or opens after the change.

- 6 Capræ.—According to Horace, the Devonian formation appeared at the end (*post*) of a hot or summer cycle, and was notable while it lasted for cold spells (*frigidus*), a murky atmosphere (*noctes*), abundant moisture (*multis lacrimis*), and much local disturbance (*insomnis*).

frigidus.—It has been remarked of the Devonian rocks, and noticeably of those in the south of Scotland, that “some of the brecciated conglomerates have much resemblance to glacial detritus, and it has been suggested that they have been connected with contemporaneous ice-action.”

- 7 noctes.—“A light still pale, and a semi-opaque atmosphere” characterised the Devonian period, according to Figuier

- 8 *insomnis*.—“restless, disturbed,” owing to volcanic action, eruptions of trap, upheavals, &c. Hugh Miller, describing the scenery of the Devonian age, says, “Ere the seeds of terrestrial plants, floated from some distant island, or wafted in the air, had found time to strike root into the crevices of the soil, some of the frequent earth-tremors of the age shook the flat expanse under the water out of which it had arisen, and the waves rippled over it as before.”

- 9-22 Even to the advances of vegetation is it heedless, for anxious though this Chloe be, the Devonian soil responds not to the ardent entreaties of her messenger, but remains cold,—as cold to vegetation as Bellerophon was to Antea or Peleus to Hippolyte.
- 9 nuntius.—Vegetation in the preceding Silurian age was principally marine and of a low type, as the algæ. But in Devonian days, some *land plants* began to appear, the forerunners or *messengers* of the luxuriant carboniferous plants that were to come. The dominant organisms of each geologic age may be said, in the same way, to have had their couriers in the preceding age.
- hospitæ.—The poet's idea seems to be that the germs of rich carboniferous vegetation were in the depths, roused to activity by their proximity to the heat of the metamorphic rocks (*tuis ignibus uri*), and anxiously waiting, as a hostess does a guest, for the Devonian formation to come down so that the Carboniferous might take its place at the head of nature's table.
- 10 Chloëñ.—χλόη “the first light green shoot of plants” in spring.
- 12 tentat.—“tries to explore” the sandy soil, as the advance guard of terrestrial vegetation would do.
- 21 Frustra.—The Devonian period, while rich in fishes, was singularly barren as a whole in the vegetable forms of life. Not till the latter part of the age did plants obtain any footing, and even then but a scanty one.
- 22 integer.—The formation showed no symptoms yet of disintegration.
- 22-32 Until the Devonian formation does return take heed to thy own ways, O Metamorphic rocks, and beware of the sinuous advances and dashing manner of thy neighbour, the central fire. Guard well thy rocky home when blackened skies and rumbling noises forebode eruptions from below; look not behind, since such would show weakness on your part; and above all, remain hard, hard as the nether millstone, to the fire that surges against your walls.
- 23 Enipeus.—ἐν ἱππέυς “the Knight, or Hotspur, within,” that is, the igneous force of the central fire, contiguous (*vicinus*) to the metamorphic rocks. It must have *some* outlet; but keep it within proper bounds (*ne plus justo*).
- 25 flectere.—This refers to the “sinuous veins,” just as *denutat* does to the “dikes” and “volcanic funnels,” through which the molten lava flows.
- 28 Tusco alveo.—τιτύσκομαι, “to fashion.”
- 30 tibia.—The pipe or channel leading to the central fire below, and through which a rumbling (*querulæ*) sound would be the first indication of an approaching eruption.

SECT. 4.—MYSTERIOUS UPS AND DOWNS.

Hecate.—With the establishment of the Metamorphic rocks was initiated a new and rather mysterious order of the course of things. From their ruins in the depths of ocean was formed the first of the fossiliferous rocks, the Cambrian: these in their turn provided material for the Silurian, the Silurian for the Devonian, and so on throughout all the ages from Palæozoic to Post-tertiary. The existence of each formation was twofold: one, above the surface of the waters; the other, submerged in the ocean. When above, it was the receptacle of vegetable and animal life; when below, it was being prepared for the life to come.

The story of one is the story of all.

The ruins of its predecessor, spread broadcast over ocean's bed, the coarser here, the finer further on, were exposed to heat and pressure and the action of submarine convulsions, were intimately moulded and mixed, and mixed over again and again in well-defined layers, till finally consolidation was attained and a stratified formation came into being, essentially differing in characteristics from its progenitor. Consolidation to the required extent having been obtained, a mysterious principle came into play whereby this new formation was raised slowly from the bed of ocean to the air of heaven. Nor at the level of the waters did it cease. Aided occasionally by shocks of earthquake, this raising principle thrust up the lofty mountains in one place, the curved strata that make the hills in another, terraces or raised beaches in a third, the lowlands and the shores, each in their proper place and in their own time. Alone and almost unassisted did this principle work at first, and peak and crag and mountain top reared their heads in honour of it while yet Life was in its infancy. And those elevating privileges Life itself could not wrest away, were it so inclined. But it could add to them; and it did.

During the countless years that passed over the newly elevated formation, whose head was in the clouds of heaven

and whose base reposed in the depths of ocean, Life—the life that had waxed in years—honoured it and with no niggard hand. The ranges and hills, the valleys and plains, river, brook, and inland sea, the very ocean itself, all teemed with myriad hordes of animated forms which, by their passing and going, swelled the volume of matter and thus glorified the elevating principle. Diatom mud and mangrove swamps, peat mosses and coal beds, all testify to the fact ; so do the calcareous and siliceous ooze of ocean, the marl of lakes, the chalk cliffs, and the nummulitic limestone.

And during all these years, this elevating divinity looked on, watchful, working, and observant. Seated on its throne, the domes of lofty mountains, it viewed the strife of centuries as they rolled by, and marked the din of battle when and where it raged. It saw the curved strata riven by convulsions and denuded by water, wind, and air, by snow and ice, until all the graceful, undulating outline was disturbed and the continuity was broken : with joy too did it mark how some portions, stronger and more erect than their fellows, withstood the fury of the destroyers and nodded smilingly to each other as hills across the ravines, the gorges, and the valleys that separated them when the contest ended. It saw the weaker strata go down amid the turmoil, and stood by to assist those which raised themselves on high, crumpled, distorted, vertical, and plicated from their efforts to ward off attacks upon the flank. It noted the fissure and the fault, and occasionally helped with its presence the side that was willing to do homage to elevation. And witness was it also of the dreaded earthquake when every now and then it came by land and sea, riding swiftly on its billowy steeds, to stagger even monarch mountains with its shock, to tumble the lesser princes, to open gaping fissures and yawning chasms, to spread havoc and ruin far and wide, and to depress in one place, elevate in another, a vast stretch of country. Thirty square miles of territory in Java subsided and disappeared in the year 1772 ; while in 1822 the coast

of Chili was raised three feet over an area of 100,000 square miles.

But each formation had its allotted span, and a day came when the life upon it had run through all the phases of existence that such a formation could produce and evolve to the highest standard, had exhausted the treasures of the soil, and could consequently proceed no further on the lines of elevation. Inorganic matter was sated with organic, and organic with inorganic. Each had given of its wealth and highest aspirations till nought that was valuable remained.

The elevating principle was quick to perceive the fact; and gathering all, the spoilers and the spoiled, it *reversed* its course, and slowly, silently, majestically conveyed earth and life to the sheltering bosom of the deep. Not as a whole, however. Some parts led the way; others followed in their turn; still others, the loftiest of their kind, remained long enough behind to witness probably the appearance of new arrivals and to give a welcome, part cheer, part sob, ere they went with heads bowed down to rejoin the comrades that awaited them below.

And here, with the hoar of ages on its brow, was comparative rest for some portions of our formation; but for others there went on a further disintegration and that moulding, mixing, and general transforming process already mentioned, whereby matter was altered, layer after layer was piled up, and hardening was advanced. Even then was the elevating principle present, observant of the work, superintending the stratification, and fostering with tender care the nuclei of the mountain, hill, and terrace that were yet to be.

Such is the scientific story. Every text book on geology vouches for the doctrine that, as Lyell puts it, "the solid land has been repeatedly moved upwards or downwards so as permanently to change its position relatively to the sea." With like unanimity do they teach that to these movements primarily are due the general contour of earth's surface, such as mountain, hill, plain, and valley: they "will

account," says Lyell, "equally for the position of those elevated masses of marine origin in which the stratification remains horizontal, and for those in which the strata are disturbed, broken, inclined, and vertical."

Nor have those movements been confined to any one age, early or late. They were initiated in the first of the fossiliferous rocks, they continued through all ages, they are still going on. "Such changes," remarks Lyell, "have actually occurred in our own days, and are now in progress, being accompanied in some cases by violent convulsions, while in others they proceed insensibly."

The usual name given to such movements are Elevation and Subsidence, or Upheaval and Depression. But though dual in name it does not necessarily follow that they are so in essence.

The general who advances far into an enemy's country and who then retreats with the spoils of war is still one and the same personage: the earthquake that elevates at one time and depresses at another is still an earthquake, and attributable to some common cause. So with Elevation and Subsidence. Their effects are manifest and intelligible, but their cause, while more or less a matter of uncertainty, is conceded to be one. While no solution of this cause has hitherto proved generally satisfactory, the general belief is that it is due to consequences ensuing in some way from the original internal heat of the earth.

Thus, both the movements and their cause are alike more or less of a mystery to modern science; very aptly, then, has Mythology symbolised those movements of *Elevation and Subsidence* by *Hecate*, a goddess whose attributes and offices are so many and strange that we find her described in classical dictionaries as "a mysterious and powerful being."

When Lyell postulates the elevated position of strata to the gradual uprising of land from the bed of ocean, and not to the going down of the sea, he says, "This idea, however startling it may at first appear, is quite in accordance with the analogy of changes now going on in certain regions of

the globe." We may paraphrase the quotation by remarking that however startling the analogy between Hecate and the movements of Elevation and Subsidence may appear at first, it will be found quite in accordance with Hesiod's description of the goddess, and with all the various attributes assigned her.

In the first place, the derivation of Ἑκάτη is very suggestive, ἕκας ἄτη, "ruin or destruction far away," pointing as it does to the fact that each formation has been formed from the ruins or destruction of the preceding, far down in the bed of ocean.

Her parents, too, Asteria and Perses, are suggestive of the scientific cause generally assigned for elevation, inasmuch as the Metamorphic rocks are close to the central heat, and destruction, scattering, and moulding have much to do with stratification:—

- ἡ δ' ὑποκυσαμένη Ἑκάτην τέκε, τὴν περὶ πάντων
 Ζεὺς Κρονίδης τίμησε· πόρεν δέ οἱ ἀγλαὰ δῶρα,
 μοῖραν ἔχειν γαίης τε καὶ ἀτρυγέτοιο θαλάσσης.
 ἡ δὲ καὶ ἀστερόεντος ἀπ' οὐρανοῦ ἔμμορε τιμῆς,
 5 ἀθανάτοις τε θεοῖσι τετιμένη ἐστὶ μάλιστα.
 καὶ γὰρ νῦν ὅτε πού τις ἐπιχθονίων ἀνθρώπων
 ἔρδων ἱερὰ καλὰ κατὰ νόμον ἱλάσκηται,
 κυκλήσκει Ἑκάτην· πολλή τέ οἱ ἔσπετο τιμὴ
 ρεία μάλ', ᾧ πρόφρων γε θεὰ ὑποδέξεται εὐχάς
 10 καὶ τέ οἱ ὄλβον ὀπάξει, ἐπεὶ δύνάμεις γε πάρεστιν.
 ὅσσοι γὰρ Γαίης τε καὶ Οὐρανοῦ ἐξεγένοντο
 καὶ τιμὴν ἔλαχον, τούτων ἔχει αἶσαν ἀπάντων,
 οὐδέ τί μιν Κρονίδης ἐβίησατο, οὐδέ τ' ἀπηύρα
 ὅσσ' ἔλαχεν Τιτῆσι μετὰ προτέροισι θεοῖσιν,
 15 ἀλλ' ἔχει ὥς τοπρῶτον ἀπ' ἀρχῆς ἔπλετο δασμός.
 οὐδ', ὅτι μουνογενής, ἥσσον θεὰ ἔμμορε τιμῆς,
 καὶ γέρας ἐν γαίῃ τε καὶ οὐρανῷ ἡδὲ θαλάσσῃ.
 ἀλλ' ἔτι καὶ πολὺ μᾶλλον, ἐπεὶ καὶ Ζεὺς τίει αὐτὴν.
 ᾧ δ' ἐθέλει μεγάλως παραγίγνεται ἡδ' ὀνίνησιν·
 20 ἐν τ' ἀγορῇ λαοῖσι μεταπρέπει ὅν κ' ἐθέλησιν·
 αἱ δ' ὀπότες ἐς πόλεμον φθισήνορα θωρήσσονται
 ἄνδρες, ἐνθα θεὰ παραγίγνεται, οἷς κ' ἐθέλησι
 νίκην προφρονέως ὀπάσαι καὶ κῦδος ὀρέξαι·
 ἐν τε δίκη βασιλευσὶ παρ' αἰδοίοισι καθίζει·
 25 ἐσθλὴ δ' αὖθ, ὀπότες ἄνδρες ἀγωνίᾳ ἀεθλεύουσιν,
 ἐνθα θεὰ καὶ τοῖς παραγίγνεται ἡδ' ὀνίνησι.
 νικησας δὲ βίῃ καὶ κάρτεϊ καλὸν ἄεθλον

- ῥεία φέρει χαίρων τε, τοκεῦσι δὲ κῦδος ὀπάξει.
 ἐσθλή δ' ἱππήεσσι παρεστάμεν οἷς κ' ἐθέλησι,
 30 καὶ τοῖς οἱ γλαυκὴν δυσπέμφελον ἐργάζονται·
 εὔχονται δ' Ἑκάτη καὶ ἐρικτύπῳ Ἐννοσιγαίῳ.
 ῥῆϊδίως δ' ἄγρην κυδνὴ θεὸς ὥπασε πολλήν,
 ῥεία δ' ἀφείλετο φαινομένην, ἐθέλουσά γε θυμῷ.
 ἐσθλή δ' ἐν σταθμοῖσι σὺν Ἑρμῇ ληΐδ' ἀέξειν·
 35 βουκολίας τ' ἀγέλας τε καὶ αἰπόλια πλατέ' αἰγῶν,
 ποιμένας τ' εἰροπόκων ὄτων, θυμῷ γ' ἐθέλουσα,
 ἐξ ὀλίγων βριάει, καὶ ἐκ πολλῶν μείονα θῆκεν.
 οὕτω τοι καὶ μουνογενὴς ἐκ μητρὸς εὐόσα
 πᾶσι μετ' ἀθανάτοισι τετίμηται γεράεσσι.
 40 θῆκε δέ μιν Κρονίδης κουροτρόφον, οἱ μετ' ἐκείνην
 ὀφθαλμοῖσιν ἴδοντο φάος πολυδερκέος Ἡοῦς.
 οὕτως ἐξ ἀρχῆς κουρατρόφος· αἶδε τε τιμαί.—Theog. 411.

Then with the pangs of labour smarting sore
 She ushered into being Hecate
 Whom Zeus Kronides honoured over all.
 On her were poured these peerless gifts,—to have
 The portioning of land and watery main ;
 Grouped has she too the starry vault's display ;
 And by immortal gods been most revered.
 For even now when haply one of men,
 Who walks this earth and works at hallowed rites,
 Would lawful please, he calls on Hecate ;
 And honour great full quickly him attends
 Whose fervent vows the goddess gracious hears,
 And bliss she adds when genius stands his friend.

For many as were born of heaven and earth
 And held as heritage the post of sway,
 Of all of these the destiny she holds ;
 Nor did the Kronos-born coerce her aught,
 Nor wrest what rights of heritage she had
 'Mongst former Titan gods, but these she holds
 As from all time the sharing was at first.
 And no mean share, one-kindred though she was,
 Of rank the goddess got,—seignioral right
 In earth, the sea, and in the starry dome ;
 But much more still when Zeus revered her too.

And much she helps and aids the one she lists ;
 In forum thronged ennobles whom she wills ;
 When men their armour don for wasting war,
 Then comes the goddess, with advisement keen
 To victory insure, and glory great
 Mete out for such as haply she elects ;

She sits in judgment close by rulers grave;
 When freemen too would struggle in the lists,
 Then does the friendly goddess help and aid,
 And he who wins by dint of force and strength
 Quickly and blithely takes the precious prize,
 And on his parents glory bright reflects.
 For whom of knights she lists to have stayed by,
 And mariners who plough the stormy blue,
 A friend she is; to Hecate they pray
 And him who shakes with booming loud the earth.

But spoil immense the kindly goddess caused
 To follow free; and, when disposed in mind,
 She quick removed all open to the view.
 A friend she's too, with Mercury combined,
 To shepherd in its stalls the booty all,
 The mountains, hills, raised beaches of the waves,
 And lines of surf-lashed cliffs, as she's inclined.
 From few she's strong, from many has made less.

And so, one-kindred as she was from birth,
 She has been marked by all the gods with gifts;
 But Zeus installed her as the nurse of youth
 That sees through her the dawn's far-searching light.
 Of tender youth a rearer thus she is
 From time of old; and such her honours are.

NOTES.

1 ἡ δ' ὑποκυσομένη.—“We know,” writes Lyell, “that there are operations now in progress, at great depths in the interior of the earth, by which both large and small tracts of ground are made to rise above and sink below their former level, some slowly and insensibly, others suddenly and by starts, a few feet or yards at a time.”

3-5 It is elevation (physical) that decides the configuration of land and water (*γαίης-θαλάσσης*); it is elevation (astronomical) or altitude that enables the configuration or relative aspects of the heavenly bodies to be marked out (*ἀστερόεντος ἀπ' οὐρανοῦ*); and it is elevation (mental) that raises men above the common level, and ranks them as immortal (*ἀθανάτοις τε θεοῖσι*).

In this way we see why the myth describes Hecate as having power in heaven, earth, and sea; and it is owing to these *physical*, *astronomical*, and *mental* distinctions of elevation that Hecate has been pictured with *three* bodies or three heads, and called Tergemina, &c.

5 θεοῖσι.—The immortal poets.

“Poetry is itself a thing of God ;
He made his prophets poets, and the more
We feel of poesie do we become
Like God in love and power—undermakers.”—*Bailey*.

6–10 Having mentioned how Elevation is specially honoured by the poets, the writer adds in complacent spirit, “*for even now when haply one of men,*” thus alluding probably to himself as one who works at the sacred rites of poetry (ἐρδων ἱερὰ καλὰ), and who invokes Elevation.

“The land of song within thee lies,
Watered by living springs ;
The lids of Fancy’s sleepless eyes
Are gates unto that Paradise,
Holy thoughts, like stars, arise,
Its clouds are angels’ wings.
Look, then, into thy heart and write !
Yes, into Life’s deep stream !
All forms of sorrow and delight,
All solemn Voices of the Night,
These can soothe thee, or affright,—
Be these henceforth thy theme.”—*Longfellow*.

7 κατὰ νόμον.—According to the canons of poetry.

10 δύναμις—power, ability, faculty ; and hence, genius, as referring to poetry. So Plato writes, “δύναμις τῆς ποιήσεως.”

11–12 Elevation presides over the destiny of each geological formation. It raised them from the depths to the surface where they held the post of sway for ages, and their destiny being accomplished, the same elevation, reversed in principle, submerged them in the ocean.

13 οὐδέ τί.—The principle of Elevation is independent of the son of Kronos, that is, of Zeus or Life, so far at least as mere matter and force (προτέρουσι θεοῖσιν) are concerned.

16 μωνογενής.—Elevation, physically and astronomically considered, rules over *one kind* of matter, the inorganic.

Powerful as she was, even when restricted to this one kingdom, she became still more so when Life (ἐπεὶ καὶ Ζεὺς) rendered her a mental force.

20–31 It is the skill, tactics, judgment, dexterity, or other ready power of performance acquired by elevated or concentrated thought, that distinguishes the orator in the forum, the warrior in battle, the ruler in council, the poet in song, the wrestler in the arena, the charioteer in the race, and the mariner in the storm.

ἐν τ’ ἀγορῇ.—

“O heavenly eloquence !

That with the strong rein of commanding words
Dost manage, guide, and master th’ eminence
Of men’s affections.”—*Daniel*.

21-23. "For by wise counsel thou shalt make thy war; and in multitude of counsellors there is safety."—Prov. xxiv. 6.

24 "He, who the sword of heaven will bear,
Should be as holy as severe."—*Shakespeare*.

32 ἀγρην.—Disintegration and denudation are favoured by elevation. The Appalachian and other ranges are supposed to have lost from removal as much material as is now contained in them, or even more; our valleys were once as high as the hills in which they nestle. Where has all the original material gone? From the *higher* to the *lower* grounds, thence to the still lower, and so on till the ocean receives all the spoil; and eventually receives the entire formation when its span is run, and a reflex elevation quietly submerges it in the deep (ῥεῖα δ' ἀφείλετο φαινόμενην).

34-36 The preceding lines treat chiefly of Hecate *above* the Earth, or Elevation, and serve to show why the goddess has been described as three-fold in nature, and an auxiliary in debate, war, courts of justice, public games of all kinds, navigation, and hunting.

The poet now proceeds to describe her as a goddess of the lower world.

34 σταθμοῖσι.—To the ocean, as already remarked, comes all the spoils of air and water upon the surface of the land, and finally the formation as a whole. Once there, erosion goes on unceasingly, chemically by means of oxidation and the formation of carbonates, and mechanically by the action of waves and currents upon the disintegrated materials, till finally a new formation is ready to emerge.

The ocean is thus, as it has been aptly called, "the coffin and the cradle of the earth," or classically, the σταθμοί or "stalls" to which the mountain cattle wend their way each geologic evening for the necessary rest and recuperation.

Ἐρμῇ.—That is, with *fluxion*. Erosive action is assisted by the waves, tides, and currents; and by the same agencies is the débris scattered broadcast over the ocean floor, the coarser and larger in one place, the finer and smoother further on, and the finest, as sand and mud, furthest of all.

It is for this reason that Mercury and Hecate are said to conduct and wander with the dead. All matter, organic or inorganic, when brought from the surface to the ocean floor, may be considered as *dead*; it has fulfilled the end for which it was made, has existed and passed away from the busy scene of life.

ληϊδ' ἀέξειν—ἀέξω "to increase, swell, multiply, foster," as would be the case with the detritus when layer would be raised on layer while the process of stratification was going on below, and while the sedimentary matter was hardening and assuming

that configuration of mountain, hill, coast barrier, and plateau, which is patent to the view when the formation emerges above the level of the sea.

- 35-36 Even in the usual acceptation of the words, the gradation of oxen, cattle, goats, and sheep, is noticeable as descriptive of various degrees of elevation, of mountain, hill, terrace, and incline. As already mentioned, "oxen" is the mythical and poetical symbol for "mountains;" and this being so, smaller and inferior cattle would naturally be used to represent smaller elevations.

Apart, however, from poetical license, the context as well as the words derivationally considered, are thoroughly significative of the physical meaning intended to be conveyed.

Βουκολίας.—*βούς κώλος* "the hornless oxen," or mountains.

ἀγέλας—*ἀγή εἶλω*, "the rolling curve," that is, the curved strata from which our hills are formed. This *ἀγή* may be considered the root of the Latin *agger*, just as *εἶλω*, or *ἴλλω*, is of the English word "hill."

αἰπόλια—*αἰπύς πόλις* "highland;" and *αἰπόλια τλατέ* "the flat highlands," that is, the tablelands, terraces, raised beaches, all of which rank among the most characteristic signs of elevation that survive to this day, and all of which are connected with the action of the waves along the coasts.

αἰγῶν—*αἶξ*, from *αἶσσω*, strictly means "a springer, a rusher," and hence, a goat, a fiery meteor, a billow; and *αἶγες*, "high waves," is regularly used by Artemidorus.

- 36 *ποίμνας*—a herd, or flock, as applied to cattle; a line, or rank, as applied to inorganic objects.

οἶων—*οἶα* or *δα*, "a sheepskin, a hem, edge, or border;" the borders or cliffs that confine the land and separate it from the sea.

εἰροπόκων—*εἶρος πέκω* "wool-combing," and hence metaphorically, "surf-beaten." Even in our own language "comber" is used to signify a long curling wave breaking on the coast.

- 37 From a few elementary substances (*ἐξ ὀλίγων*) are our mountains and hills made solid; and from innumerable particles (*ἐκ πολλῶν*) are they condensed into smaller compass. And in a mental sense, brevity and condensation are notable characteristics of the elevated or sublime in language.

- 40 *κουροτρόφον*.—Education is elevation; and in the word "educate" we see "Hecate" peeping forth, as it were, and almost encouraging the derivation of the Goddess from *ἐξάγω*, the equivalent of the Latin *educo*.

"Delightful task! to rear the tender thought,
To teach the young idea how to shoot,
To pour the fresh instruction o'er the mind,

To breathe the enlivening spirit and to fix
The generous purpose in the glowing breast!"

Thomson.

With the idea of "elevation," much of the apparently mysterious disappears from the mythological Hecate. Hesiod's lines have elucidated many of the attributes assigned her, such as helping the poet, orator, warrior, and judge, the athlete, hunter, sailor, and the shepherd; as being the fostering guardian of the young; and a powerful influence in the moulding of prospective formations. Especially has he explained her title to Triformis and Triceps by showing that elevation is physical, astronomical, and mental. As for the epithet Tergemina, it really implies "thrice doubled, or three pairs," and means that each form of the Triformis or three-formed goddess is susceptible of a *double* sense. Physically, she would be upheaval and depression; astronomically, altitude and declination; and mentally, sublimity and bathos. In the character of upheaval, altitude, and sublime, she would be apt to be confounded with Luna; in those of depression, declination, and bathos, with Proserpine; and midway between the high and low, in a state of tremor, oscillation, or reflection, with Diana.

The cross-roads, as a pictorial emblem, is suggestive of high and low; and the same dual idea is evidently connected with cemeteries, and with the blood of the murdered—which sinks into the ground and cries to heaven above for vengeance.

"Other sins only speak, murder shrieks out.
The elements of water moisten the earth,
But blood flies upward and bedews the heavens."

Webster.

Again, since each formation is the sepulchre of the preceding one, Earth is a vast cemetery; and since sorcery is but transformation, what greater sorcerer can there be, physically, than a Hecatean process which, after submerging any one formation and wandering with its freight of organic and inorganic dead for countless thousands of years, has transformed it, elevated it, and has thus sent forth the

spectres and phantoms of the Silurian age to the Devonian, of this to the Carboniferous, and so on to Post-tertiary time.

“And in that rock are shapes of shells, and forms
Of creatures in old worlds, of nameless worms,
Whose generations lived and died ere man,
A worm of other class, to crawl began.”—*Crabbe*.

And what greater sorcerers, mentally speaking, can there be than the poet, philosopher, and scientist, who with magic wands transform the pebbles of thought and of reality to pearls, and leave such crystallised fossils of the mind in the written page wherein we walk and commune with the mighty dead.

“The past but lives in words: a thousand ages
Were blank, if books had not evoked their ghosts,
And kept the pale, unbodied shades to warn us
From fleshless lips.”—*Bulwer*.

In a physical sense, tremors and other convulsive movements of the earth are announced by the uneasiness of cattle and by the howling of dogs; in a mental sense, the cynic and critic are the first to hail with praise or condemnation the productions of literary aspirants, and to act as “whetstones, which unable of themselves to cut, can still give a cutting edge to iron.”

As to the pictured representation of the three-headed goddess, the dog would be emblematic of the subsiding process, or the long night during which each formation sank into and was guarded in the depths; the horse, of the elevating process whereby it rode from the bottom to the surface of the sea; and as for the middle head, the lion (λάω, “to see”) may denote the visibility of earth above the waters; the moon, the incessant changes going on in it; the sow, the productive powers of nature; and the woman, that our terrestrial globe was destined for the human race.

BOOK SIXTH.

TITANIC TIES—(*continued*).

CHAPTER I.

THEOGONY.

KRONOS and RHEA	{	Hestia (Vesta)
		Demeter (Ceres)
		Hera (Juno)
		Hades (Pluto)
		Poseidon (Neptune)
		Zeus (Jupiter)

MYTHS.

Kronos.—The Saturn of the Latins, son of Uranus and Gē, and youngest of the Titans. He it was who, at the instigation of Gē, used the sickle upon his father and expelled him from the throne. He delivered the Hecatoncheires and Cyclopes from Tartarus, only, however, to thrust them back again when he had been raised to the kingdom. He married his sister Rhea, but as Uranus and Gē had predicted that he would be dethroned by his own son, he swallowed each of his children according as they were born. Kronos is generally identified with "Time," and is represented as having wings on his shoulders, chains on his feet, and a pruning-hook in his hand.

Rhea.—The Ops of the Latins, sister and wife of Kronos, by whom she begot Vesta, Ceres, Juno, Pluto, Neptune, and Jupiter. Kronos having devoured the first five of these, the incensed mother sought counsel of her parents, Uranus and Gē, before the birth of her last child. By their advice she went, when near her time, to Lyctus in Crete and there begot Jupiter in a cave of Dicte. In order to deceive Kronos, she dressed a stone in swaddling clothes and gave it to her husband, who swallowed it in the belief that it was his child.

Hestia.—The Roman Vesta, the first of the children swallowed by her father Kronos. When Apollo and Neptune sued for her hand, she obtained from Jupiter the privilege of remaining a virgin for ever. Always regarded as the goddess of the hearth, or of the fire burning on the hearth, she thus symbolised not only the central hearth of the Universe and that of Earth, but also the central hearth of cities and towns and the inner chamber of private homes. But few special temples were erected to her honour, as each residence and town had in itself the altar of the goddess, namely, the hearth, which was at once the centre of domestic and civic happiness, and a sanctuary for the suppliant when fleeing from danger. The town-hall, or Prytaneum, was consecrated to her, whence she is also called Prytanitis: in it, and in whatever temple was erected to her, a perpetual fire was kept burning, some of which was taken by intending emigrants to kindle on the hearth of their new homes. When sacrifices were offered, Vesta was the first deity to be invoked, and to her were the first libations presented.

Demeter.—The Roman Ceres, universally recognised as “Mother Earth,” γῆ μήτηρ, the protectress of agriculture and of all the products of earth, and consequently the introducer of the laws and regulations that lead up to civilised life. By Jupiter she begot Persephone, or Proserpine, who was afterwards carried off by Pluto with Jupiter’s consent. To appease Demeter, who shunned Olympus and refused fertility to earth, Proserpine was finally permitted to return and remain for two-thirds of the year with her mother. It is stated that Demeter fell in love with Iasion, and in a thrice ploughed field in Crete, she became by him the mother of Plutus. The Eleusinian mysteries were instituted in her honour; and in Rome the property of traitors to the commonwealth was often made over to her temple. She is pictured with large breasts, robes falling to her feet, and crowned with corn or poppies.

Hera.—The Roman Juno, was brought up, according to Homer, by Oceanus and Tethys, and subsequently became the wife of Jupiter, by whom she begot Hebe, Mars, and Ilithya. Hesiod says that she begot Vulcan without assistance, while other writers affirm that he too was the son of Jupiter and Juno. On her marriage with Jupiter, she was honoured with presents from all the gods, and particularly from Gē, who presented her with a tree bearing golden apples. These apples Juno in turn gave to Jupiter, who consigned them to the care of the Hesperides. This marriage, the “Sacred Marriage” (ἱερὸς γάμος), as it has been called, made her be esteemed as the deity presiding over wedlock and the birth

of children ; and almost as many cities contended for the honour of its celebration as for that of her birth. The other deities reverence her ; Jupiter listens to her counsels, communicates his secrets to her, and is often swayed—sometimes against his will—by her entreaties, her passions, or her jealous fears. She is ever jealous of any one being preferred before her, and persecutes alike, whether mortal or immortal, all those favoured with the love of Jupiter. She is pictured as majestic in appearance, of mature age, with forehead broad, and eyes large and widely opened ; a diadem is on her head, a sceptre in her hand, and a flowing veil hangs down behind or covers her from head to foot. Peacocks draw her chariot, and Iris is her peculiar messenger.

Hades.—The Roman Pluto, after the conquest of the Titans, got for his share the empire of the nether world. He has been variously called *Aïdes*, *Plouton*, *Dis*, the infernal Jupiter (*Ζεὺς καταχθόνιος*), King of the Shades (*ἄναξ ἐνέρον*) and various other names. He abducted *Persephone*, the daughter of *Ceres*, and made her his queen. He is described as fierce, inexorable, and hateful to mortals ; as keeping the gates of the lower world closed to bar egress, and as the possessor and giver of all the metals contained within the earth. No temples were raised to his honour. He is generally pictured as sitting on a throne, holding in his hand a key, and having the three-headed dog *Cerberus* lying near.

Poseidōn—The Roman Neptune, was allotted the sea for empire when the Titans were overcome. He is generally regarded as the god of the fluid element, and has for his queen *Amphitrite*, daughter of *Nereus* according to *Hesiod*, or of *Oceanus* according to others. He rules the sea, gathers the clouds, calls forth storms, and has it in his power to shake the very earth round which his waters roll : hence he is styled *γαίης*, *ἐνοσίχθων*, *Κινητὴρ γῆς*, and other like epithets. He has also the power of assuaging the angry billows and of calming the tempests which he or the wind gods may have raised. He rides over the waves in a chariot drawn by horses with brazen hoofs and golden manes, and in his hand he holds a trident, the peculiar emblem of his authority, as the key is of his brother *Hades*. The dolphin and horse are other symbols of his, particularly the latter which he was said to have created, and the management of which he taught to mortals : for this reason he has been styled *ἵππιος* *ἄναξ*, and was considered the patron of horse and chariot races.

Zeus—The Roman Jupiter, was the youngest child of *Kronos* and *Rhea*. *Kronos*, as already related, having swallowed all the preceding children he had by *Rhea*, the latter was so grieved

that, when about to give birth to Zeus, she took counsel of Uranus and Gē in order to try and save her unborn child. They, influenced by her entreaties, sent her to Lyctus in Crete where Zeus was born. Thence he was brought to Dicte and concealed in a cave of Mt. Ægæon. Rhea dressed a stone in swaddling clothes and gave it to Kronos, who swallowed it in the belief that it was his son. As the years rolled by Zeus increased in strength, and Kronos, deceived by the crafty counsels of Gē, threw up the children whom he had swallowed, and first of all the stone, which stone was afterwards fixed by Zeus at Pytho under Parnassus. After this, one of the first acts done by Zeus was to deliver the Cyclopes from Tartarus, and they in gratitude gave him the thunder and lightning with which he rules gods and men.

Such is the Hesiodic account, to which many additions have been made by later writers. Thus Apollodorus makes no mention of Rhea taking counsel of her parents nor of her going to Lyctus: he says that Rhea, when ready to bring forth Zeus, went to Crete, begot the child in a cave of Dicte, and gave him in charge of the Curetes and the nymphs, Adrastia and Ide. These latter were the daughters of Melisseus, and they brought up Zeus with the milk of Amalthea: the Curetes in the meantime kept guard over the child, and struck their shields with spears so as to prevent Kronos from hearing the infant's cries. Rhea gave Kronos a stone to swallow, dressed in the manner already described. When Zeus grew up, he took Metis, the daughter of Oceanus, as his ally: she gave Kronos a potion to drink that made him vomit, first the stone, then the children whom he had swallowed. Many places, such as Mt. Ithome in Messenia, Thebes in Boetia, Ægæon in Achaia, Olenus in Ætolia, Parrhasius in Arcadia, Dodona in Epirus, and other localities claimed the honour of being the birthplace of Zeus; but he is generally believed to have been born in Crete. While other nurses, such as the Hyades and the Arcadian nymphs, have been mentioned by writers, still the common belief held good with regard to the daughters of Melisseus, and to Amalthea. This last was supposed to be a goat, which Zeus afterwards placed among the stars; but other accounts affirm that Amalthea was a nymph, daughter of Oceanus,—or of Helios, Hæmonium, Olenus, or Melisseus, for traditions vary in this particular too,—who fed Zeus with the milk of a goat. Amalthea is alluded to by the poets sometimes as “Olenia capella.”

Closely associated with the birth and bringing up of Zeus we find in addition to the Curetes mentioned by Apollodorus, other more or less curious divinities, such as the Dactyli, the Telchines, and the Cabiri.

1 *Dactyli* (Δάκτυλοι), mythical beings connected with the worship of Rhea and Cybele in Crete, and, according to some, in Phrygia and Samothrace. To them were ascribed the discovery of iron, and the art of working it by means of fire. They are said to be the original inhabitants of Mt. Ida in Crete, and are hence called the Idæan Dactyli, Δάκτυλοι Ἰδαῖοι, and Cicero calls them "Digiti Idæi." They were originally three in number, according to Strabo, viz., Κέλμης, Δαρναμενεύς, and Ἀκμων, but their number was afterwards increased to five, ten, fifty-two, and one hundred.

2 The *Cabiri* (Κάβειροι) are described as mystic divinities worshipped particularly at Samothrace, Lemnos, and Imbros, as also at Thebes, Anthedon, Pergamus, and various other parts of the world. According to some accounts they are descended from the Dactyli, but most of the ancient writers ascribe their parentage to Vulcan and Cabeira, the daughter of Proteus.

In Egypt their number was said to be eight, but the best accounts make them three originally, viz., Axieros, Axiokersa, Axiokersos, and to these was subsequently added a fourth, Cadmilos or Casmilos.

They are described sometimes as kindly, sometimes as malevolent beings, who were skilled in metallurgy; and as dwarfs with protuberant bellies, or with large genitals. Herodotus says that they were worshipped at Memphis as the children of Vulcan, and that they resembled the dwarf gods, or πάταικοι, whom the Phœnicians attached to the prows of their vessels.

Their influence over vintage is suggested by their promising abundance of Lemnian wine to the Argonauts, and by the vows which the Pelasgians offered in a time of scarcity to Zeus, Apollo, and the Cabiri.

Additional accounts relate how lovers swear by them when pledging their vows, how those who are crossed in love call upon them for vengeance, and how such as are exposed to loss of life, especially from the sea, invoke their assistance.

Their rites lasted for nine days; were celebrated with great secrecy, splendour, and attention to details; and their mysteries, according to Attic writers, were particularly calculated to protect the lives of the initiated.

They have been more or less connected with some one or all three of the following group of deities, Rhea, Ceres, Proserpine; Rhea, Ceres, Venus; Zeus, Minerva, Mercury; Zeus, Juno, Minerva; and it has been particularly noted that wherever the worship of the Cabiri prevailed, there, too, did that of Hecate.

3 The *Telchines* (Τελχίνες) are said to be a family or tribe descended from Thalassa, or from Neptune, and the following names of

individuals among them have been preserved,—Argyron, Chrysaon, Chalcon, Hormeneus, Mylos, Simon, Lycus, Atabyrius, Antæus, Megalesius, and Nikon.

Eustathius describes them as marine beings without feet, and having fins for hands ; and the same writer alludes elsewhere to them as the dogs of Actæon who were changed into men. According to some accounts they were the original inhabitants of Crete, and went from there to Cyprus, and thence to Rhodes, where, in conjunction with Caphira, daughter of Oceanus, they brought up Neptune, who had been entrusted to their care by Rhea ; other accounts describe them as proceeding from Rhodes to Crete, and thence to Bœotia. They are variously alluded to as—

- (a) Cultivators of the soil, and ministers of the gods.
- (b) Inventors of useful arts and institutions. They worked in brass and iron, made images of the gods, and fashioned the scythe for Kronos and the trident for Neptune.
- (c) Sorcerers who could assume different forms at pleasure, and were able to bring on rain, hail, and snow. They mixed Stygian water with sulphur in order to destroy plants and animals ; and their very eyes and aspect are said to have been destructive.

Strabo says that those Rhodian Telchines who assisted in bringing up the infant Zeus in Crete were called Curetes ; and it is also stated that Rhea, Zeus, and Apollo were hostile to them and encompassed their ruin, Apollo in the shape of a wolf, and Zeus by an inundation.

CHAPTER II.

KRONOS, THE TIE OF TIES.

Kronos.—What is Time? By comparison with Eternity we arrive at the notion of a something having a beginning and an end. When was the beginning? Following Genesis and Mythology, the only literary sources we have left to follow, we find that *Kronos*, personified *Time*, was subsequent to Æther and Hemera, that is, to Light and external universes; subsequent too, as being the youngest, to his brother Titans, that is, to matter endowed with magnitude; but previous to the cutting away of Uranus, that is, to the formation of a firmament. This would lead to the deduction that *time* did not enter into the work of the First Day mentioned in Genesis, and that it is an unknown quantity for Light and for universes other than ours; that *time* had a beginning subsequent, however short, to actual matter, and came into being somewhere between the evening and the morning of what constituted the Second Day in Genesis; and that *time* consequently appertains to each and every sun, star, and planet, embraced within the firmament. In brief words, *time* is not for Earth alone: it is for our Universe. This is curiously interesting, as bearing on that much mooted question, the Hexameron of Genesis, and pointing to the opinion entertained regarding the signification of the word “day” by the framers of Mythology.

What the measure could be of time previous to the formation of a firmament is unintelligible. Container and contained were one, and standard there was none unless we except the changes going on in the mass, and denote those changes simply as events. The same may be said of many an age succeeding the firmament of the Second

Day, during which we must suppose the parent mass as disentangling and disrupting and forming itself into systems, and those systems into suns, and the minor bodies moving round those suns. The myth that weds a Kronos to a Rhea is but equivalent in this sense to saying that "time rolled on," that event succeeded event, and that while the celestial bodies were being propagated and were fashioning themselves into shape, Time reigned supreme. But this would bring us down to that evening and morning which constitutes the Fourth Genesiac Day, when "God made two great lights; the greater light to rule the day, and the lesser light to rule the night: the stars also."

There is no multiplication of celestial bodies after this period, and we now find definite measurers or rulers appearing on the scene for the first time, to stand "for signs, and for seasons, and for days, and for years," to disturb the despot sway of Time, and afford an opportunity for one, if one there were, combining force and matter in a pre-eminent degree, to oust the potentate from his throne. And one there was. But to dwell upon this would be to anticipate the Hesiodic narrative, and so we leave it for the present.

The derivation of Kronos would at first sight appear to be *κρίνω* "to order," "to arrange," as time may be considered "an order or succession of events;" but it is more likely to be *κορέννυμι*, "to satiate," "to glut," seeing that the Latin *Saturnus* has the same idea of satiety (*sat*) involved in it.

The ancients had no inordinate idea of the power and antiquity of Kronos. Modern writers entertain much the same opinions in regard to him. Thus :—

"We estimate the duration of human history at 6,000 years; but immeasurable as this time may appear to us, what is it in comparison with the time during which the earth carried successive series of rank plants and mighty animals, and no men; during which, in our neighbourhood, the amber tree bloomed and dropped its costly gum

upon the earth and in the sea; when in Siberia, Europe, and North America groves of tropical palms flourished; when gigantic lizards, and after them elephants, whose mighty remains we still find buried in the earth, found a home? Different geologists, proceeding from different premises, have sought to estimate the duration of the above created period, and vary from a million to nine millions of years. And the time during which the earth generated organic beings is again small when we compare it with the ages during which the world was a ball of fused rocks.

"For the duration of its cooling from 2,000 deg. to 200 deg. Centigrade, the experiments of Bishop upon basalt show that above 350 millions of years would be necessary. And with regard to the time during which the first nebulous mass condensed into our planetary system, our most daring conjectures must cease."—*Helmholtz*.

"In order that cosmical matter or the prodigious assemblage of so many stars could be distributed according to the curves revealed by the telescope, and winding round each other in gigantic spirals under the governing action of the combined attraction of all parts which compose this universe, it would require an incalculable series of accumulated years to pass away."—*Flammarion*.

"'Time' is growing up daily into importance as an element in the exercise of force. The earth moves in its orbit in time; the crust of the earth moves in time; light moves in time; an electric magnet requires time for its charge by an electric current. In some of the known cases of action in time, something happens while the time is passing which did not happen before, and does not continue after."—*Faraday*.

With these tributes to the mighty Kronos, let us go back to the time when he wrested from his sire the reins of government. All the characters that have been introduced and described from that fateful event,—the progeny of Night, the ἑρεβεννή and ὀλοή; of Pontus who begot Nereus, Thaumas, Phorcys, Ceto, and Eurybia; of their descendants

too, as well as of those sprung from Oceanus, Hyperion, Crius, and Cœus;—all these are but interludes cunningly and methodically brought in by the master hand of Hesiod to prepare the mind for Kronos and the children of Kronos. Intentionally has he wandered in individual detail, and brought the reader through heaven and earth, through air and sea, through water and through land, until he has forced upon even the dimmest intelligence a perception of the glorious truths he was desirous to impart. The intelligence thus aroused, he now goes back to the misty past of his departure, and collecting his forces gives a condensed but succinct account of how each particular mass, our earth especially, could evolve from nebosity to what we see it in our own planet.

When the bond of union between Uranus and Gē was dissolved, and when the former had retired, leaving for sole heritage to his children the obloquy of a name and the prophetic threat that as they sowed, so should they reap, Gē retained, as we have seen, the offspring born of the two, the matter and force of all kinds, knowable and unknowable. But immortal mothers no more than mortal ones seem destined to retain for ever their sons and daughters: preferences and mutual affinities occur, ties are formed, offspring born, and the inevitable separation and emigration from the “noverca” are the result. So too with the parent nebula, the *πελώρη* and *εὐρύστερνος* Gē. Thia and Hyperion wooed and wed and went to seek their fortunes in distant countries, carrying with them such a magnificent dowry—surely they must have been favoured children!—as enabled them to stud the canopy of heaven with the sun, the moon, the planets, and the stars. It was but a small pittance, this earth of ours, that Gē reserved unto herself in her declining years, for old she had grown. The love light had departed from her eyes with Uranus, and their exceeding brilliancy had been dimmed when Hyperion and Thia had gone with their belongings; her steps felt heavier, the warm blood ran more sluggishly in her veins, and day by day she grew more secretive and retiring within herself.

Anatomical Geology has hunted up the record of those days and has vouched for the foregoing. It states that loss of light and heat was constantly going on for the parent mass and for each successive one; that each nebula left behind consisted of progressively heavier matter, and that cooling, condensation, and gravitation towards its nucleus went hand in hand.

And yet withal she was still a stately dame and never disinclined to assert herself when her children's wrongs roused her into action. Zeus, all powerful Zeus himself, was witness to her wrath when in after years she spurred on the Giants to avenge her Titan children, and still later commissioned Typhœus to take vengeance for the Giants. Love of offspring was indeed her virtue and her weakness; otherwise she might still be queen regnant with Uranus. And she kept this characteristic to the last. Widowed and bereft, she grew colder to the outside world, retired more and more to the privacy of her chamber, and left the management of affairs to the two who still clung closest to her, to Kronos surnamed the Wily, and his sister partner, Rhea. And thus did time roll on "unsoiled and swift, and of a silken sound," till—— But let the scientific records of the past relate what followed.

When further disruption as regards our planet ceased, it probably left earth in a more or less nebulous condition and equal to the sun in volume, heat, and brilliancy. But as heat was being constantly lost by radiation into space, with the necessary consequence of cooling, the result would be that in time, the duration of which it is impossible to fix even approximately, our planet, originally gaseous, would ultimately assume a condition of igneous fusion or fluidity. Now, between these two extremes changes occurred, the magnitude and number of which can be only compared with the length of time in carrying them out; and these changes will best be understood by repeating in part the history of an independent nebulous mass, such as earth was, as told by Bonney: "It is composed of somewhat similar material, and even at the moment of severance

is probably still in a more or less nebulous condition, and at a very high temperature. As it proceeds on its journey heat is lost by radiation into space ; the temperature of the whole mass falls, but the outer layers are especially chilled. For a considerable while there will be an up and down movement in the orb, the cooler matter descending from the exterior, the hotter ascending from the interior. By this means, in process of time, a kind of stratification will be produced in the mass, the lighter and more readily vaporised substances working their way towards the exterior, the heavier and those which most readily solidify accumulating at the interior. This transference and selective ordering will continue so long as the materials of the planet remain in a vaporous or even in a thoroughly liquid condition."

While, then, the nebulous or highly fluid condition prevailed, it would be only when cooled at the surface that matter could at first assume any of its specific properties, to lose them possibly again when it experienced the increased heat after sinking by its weight ; but as time went on and as the cooling process extended from the surface downwards, every particle of matter on or coming to the periphery, and which did not mount upward owing to its superior volatilisation, would feel the effects of cooling and gravitation, and begin to move downwards towards the centre, the heavier first, the less heavy next, and so on according to their respective densities.

In brief language, according as elementary and compound matter came into being through time, it was swallowed down. And this is exactly what Mythology tells us when it declares that Kronos swallowed his children as soon as each one was born.

Here is Hesiod's description of the occurrence :

Ῥεῖα δ' ὑποδμηθεῖσα Κρόνῳ τέκε φαίδιμα τέκνα,
Ἰστίην, Δήμητρα, καὶ Ἥρην χρυσοπέδιλον,
ἰφθιμόν τ' Ἀΐδην, ὃς ὑπὸ χθονὶ δώματα ναίει
μηλέες ἦτορ ἔχων, καὶ ἐρίκτυπον Ἐννοσίγαιον,
5 Ζῆνά τε μητιόεντα, θεῶν πατέρ' ἦδὲ καὶ ἀνδρῶν,
τοῦ καὶ ὑπὸ βροντῆς πελεμίζεται εὐρέϊα χθών.

- Καὶ τοὺς μὲν κατέπινε Κρόνος μέγας, ὅστις ἕκαστος
 νηδύος ἐξ ἱερῆς μητρὸς πρὸς γούναθ' ἵκοιτο,
 τὰ φρονέων, ἵνα μὴ τις ἀγαῶν Οὐρανίωνων
 10 ἄλλος ἐν ἀθανάτοισιν ἔχοι βασιληΐδα τιμῆν.
 πεύθετο γὰρ Γαίης τε καὶ Θύρανοῦ ἀστερόεντος,
 οὐνεκά οἱ πέπρωτο ἑὼ ὑπὸ παιδὶ δαμῆναι,
 καὶ κρατερῷ περ ἔοντι, Διὸς μεγάλου διὰ βουλὰς·
 τοῦνεκ' ἄρ' οὐκ ἀλασκοπιὴν ἔχεν, ἀλλὰ δοκεύων
 15 παῖδας ἐοὺς κατέπινε· Ῥήν δ' ἔχε πένθος ἄλαστον.

Theog. 453.

Subdued by Kronos Rhea children bore
 Distinguished,—Hestia, Demeter too,
 And Hera who has sandals flecked with gold;
 Despot Hades with a ruthless heart
 Who dwells within the mansions underground;
 The one that rocks our globe with rumbling hoarse;
 And purposing Zeus, of gods and men the sire,
 Whose thunder shakes the broad domain of earth.
 All these indeed, as one by one they came
 From mother's hallowed womb unto her knees,
 Did the all-powerful Kronos swallow up;
 Planning those things betimes that other none
 Of all the high and mighty gods would have
 Imperial sway among th' immortal host.
 For judge he did from earth and starry sky
 How, powerful even though he was, his doom—
 To be by his own child subdued,—was fixed
 Through the wise counsels of a mighty God.
 For reason such no careless watch he kept,
 But, biding time, swallowed his children all;
 And pain, tormenting pain held Rhea fast.

NOTES.

- 1 Ῥεία—from ῥέω, "to flow," and allied to ἔρα, "the earth," denotes our globe in a state of *fluxion*, as it was all through the nebulous and far on into fluid igneous time.
 ὑποδμηθείσα—"subdued" in the sense of having been tamed or quieted. The nebula had lost a great deal of its pristine brilliancy and heat by radiation into space.
 φαίδιμα—φάω ἴδιος, "specific appearing." Matter, owing to cooling, began to assume specific or *distinctive* qualities. Instead of being *mere* matter, it assumed the characteristics of solid, liquid, and æriform,—to shape itself into the elements, their oxides, and the compounds of those oxides. "It is possible, of course, that every elemental substance is only a form or mode of manifestation of some one common matter, so

that in the apparent diversity of inorganic nature there may be a latent unity."—*Bonney*.

- 2 χρυσοπέδιλον.—Our precious metals, metals of all kinds indeed, are seldom in a state of purity, but generally occur as oxides, carbonates, sulphurets, &c., and are found especially in the primary and metamorphic rocks, *the feet* of the geological rocks.
- 4 νηλεές ἤτορ.—The nucleus of our globe.
- 8 νηδύος ἐξ ἱερῆς.—As matter worked from the interior (νηδύος) to the exterior (πρὸς γούναθ') of the earth (μητρὸς), it would on arriving be cooled, assume specific properties, and thus becoming denser would again sink or be swallowed down (κατέπινε).
- 9 ἀγανῶν—ἀγανός or ἀγαυρός, from ἄγω αἶω, or ἄγῳ αἶρα, would literally mean "going to the air," as matter would when ascending from the interior to the surface. Even the usual meaning, "illustrious, proud, stately," is simply "having a lofty air, having a haughty air," and refers to the characteristics one assumes.
- 11 πείθετο.—Experience of the past, of changes caused by cooling that produced a firmament and a more contracted nebulous mass, gave promise of what would come.
- 15 πένθος ἄλαστον.—The high temperature of the interior would be constantly antagonistic to the pressure from above of cooling matter, and for many a long day would our orb be thus racked. Speaking of the early igneous period, Figuier says, "As to the globe itself, without being so much agitated as its fiery and mobile atmosphere, it too would be no less the prey of perpetual storms, occasioned by the thousand chemical processes which were in action in its molten mass."

Apollodorus, while condensing the above description, emphasises the order in which the offspring were swallowed. Having mentioned how Kronos had liberated the Cyclopes and Hecatoncheires from Tartarus, he goes on thus :

"ὁ δὲ τούτους μὲν ἐν τῷ Ταρτάρῳ πάλιν δῆσας καθείρξε, τὴν δὲ ἀδελφὴν Ῥέαν γήμας, ἐπειδὴ Γῆ τε καὶ Οὐρανὸς ἐθεσπιάδουν αὐτῷ λέγοντες ὑπὸ παιδὸς ἰδίου τὴν ἀρχὴν ἀφαιρεθήσεσθαι, κατέπινε τὰ γεννώμενα. Καὶ πρώτην μὲν γεννηθείσαν Ἑστίαν κατέπιεν, εἴτα Δήμητραν καὶ Ἥραν, μεθ' ἃς Πλούτωνα καὶ Ποσειδῶνα."—1. 5. 1.

"But those indeed having again bound he imprisoned in Tartarus, and having wed his sister Rhea, he swallowed all those begotten of her, since both Gē and Uranus, lying quiescent, foreshadowed to him that the supreme power would be wrested by his own son. And he swallowed Vesta, the first indeed that was begotten, then Demeter and Hera, after these Pluto and Neptune."

And thus did Time roll on through the ages, Kronos "biding his day," as Hesiod says, and well earning his name by satiating his maw with the grewsome diet begotten of himself. On it rolled. The aftermath of the nebulous period, the sowing of the igneous, crop after crop that but scarce appeared,—all were gathered with its scythe and stowed away to appease its cravings and prolong its sway.

If we would form a better conception of those events, and of what resulted from them, we must turn to the heavens for information. By means of the spectroscope the light from self-luminous bodies can be analysed so as to show what elements are present in their luminous vapour. Some nublæ, either through distance, size, or elementary nature, defy or leave in doubt even spectroscopic analysis. But those stellar bodies over which it has control have been distinguished into four great classes: those which, like Sirius, show the presence of hydrogen only, or of hydrogen and a feeble proportion of metallic vapours; those which, like our sun, give evidence in addition to hydrogen, of the more stable metals such as sodium, magnesium, iron, &c.,—but of no metalloids or compounds; those which, like the red stars, indicate the presence of others of the metals and of metalloids; lastly, those which, like Mars, Venus, and the Moon, present the evident appearance of compound bodies similar to our own.

According to Lockyer, nebulæ and stars of the first type are the hottest and most brilliant; those of the second are cooler and their materials more differentiated into elements; those of the third and fourth are still cooler, their materials still more differentiated and marked by the appearance of metalloids and compounds; and so on, the loss of hydrogen accompanying increased evolution, till finally we come to conditions of temperature and materials such as are represented by our Earth, when all the free hydrogen will have disappeared. Commenting upon this a writer says, "According to this view the atoms of all the elements existed originally in the nebula disassociated from each other by reason of the intense heat. As the nebula gravitated

towards its nucleus and cooled, the atoms came together and the elements appeared in a certain order, beginning with hydrogen, and passing on through the metals and metalloids into compounds such as we find upon our globe." Reasoning thus, we would have in time a very different order of things from that which took place earlier, as expounded by Bonney. The earlier periods of incandescence and of igneous fluidity swallowed elementary matter as soon as it was formed. We now find that a reverse procedure is in wait for every stellar body ; that it has commenced for some, is more advanced for others, and that it has been most fully accomplished with regard to one particular nebula which, after cooling and differentiating into hydrogen and elements not yet recognised, into calcium and magnesium, sodium, titanium, iron, manganese, and other metallic elements, has gone through the further stages of metalloids and compounds, till at last it has become the Earth we call our own. The Kronos, that once swallowed those his children, has been somehow and sometime forced to disgorge them, " to vomit them up," as the Myth words it.

Particulars regarding the time when such an event occurred are interesting. The book of Science is mute concerning it : it assigns no period for the change from the swallowing of elementary and compound matter to the disgorgement and establishment of the same. It simply asserts that the first process was followed by the second, without indicating any great event whereby the parting of the ways may be sharply distinguished. Not so, however, with Genesis and Mythology. We get a more definite idea of the event from these two sources, and find one supplementing the other.

"After Zeus was born and had waxed in strength and years, Kronos was compelled to throw up the children he had swallowed : assisted by those, Zeus, after a protracted struggle, succeeded in conquering the Titans and banishing Kronos."

So runs the substance of the Myth.

"And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit after his kind, whose seed is in itself, upon the earth : and it was so.

“And the earth brought forth grass and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind : And God saw that it was good.

“And the evening and the morning were the third day.”

Gen. i. 11, 12, 13.

In those words of Genesis we find Life introduced for the first time upon our globe. If, then, we succeed in proving that the Zeus of Mythology is personified Life, we may be warranted in arriving at the following more or less definite and important conclusions, through collating Genesis and Mythology :

1. That Zeus or Life came into existence during the interregnum that marked the ingulfing of matter formed by surface cooling and the permanent appearance of elementary and compound bodies on the surface : that this period, characterised as the Third Genesiac Day—and presumably, its later portion,—was also the later part of the “Golden Age” of Mythology.
2. That Zeus or Life appeared first as vegetable, not animal matter.
3. That the condition of matter as denoted by Kronos and Rhea, a struggle on the part of molecular matter, did not cease for some time after Life or Zeus appeared.
4. That the Titanomachia marked the end of this struggle.
5. That it is within the bounds of reasoning conjecture to suppose some form or forms of life as capable of existing in *any stellar body* evincing a decided advance from atomic to molecular and molar matter.

CHAPTER III.

THE CURDLED SPUME OF AGES.

THERE are scores of myths connected with the offspring of Time, each myth embodying a scientific truth ; but they are so interwoven with other characters that their explanation would interfere too much with the continuity of the story. It will be sufficient for our purpose to identify and establish the physical fact embodied in each divinity.

Hestia, the Latin *Vesta*, is the physical emblem for the foundation of our earth. This primal vestment, or first step towards building on the molten fire, is manifested clearly by calling her the eldest born of Kronos and Rhea, by making her the goddess of the hearth and of the fire burning thereon, by including her in all sacrificial rites, invoking her first, presenting her with the primal offerings, and by giving her such epithets as *antiqua*, *primæva*, *cana*, &c. The derivation, too, ἵστημι, “to stand, check, make fast,” points indubitably to the superstructure which stands over and checks the central fire, and affords a solid basis or stability for all that is above. This is well marked by Ovid :

Stat vi Terra sua, vi stando Vesta vocatur.

The earth is stable through inherent force ;
From this stability is Vesta named.

With this idea of stability, *Vesta* has by a natural transition been extended from earth as a whole to its magnified types, our system, and the universe ; and to its miniature types, countries, cities, towns, and private dwellings. What the foundation would be to the earth, the hearth-stone would be to the family,—the first essential to a home, the basis and prop of the surrounding structure, a foundation where-by fire could be kindled with safety and kept in check,

a prytaneum (πύρ τανύω, "stretched over the fire") round which the members could gather for social converse and the comforts of civilised life, and at which order, respect for authority and age, and purity of morals could be inculcated, and the rites of hospitality afforded. It is as the representative of stability that Vesta is included among the twelve Dii Consentes who formed the council of Zeus.

But the primal idea was the physical one, namely, the foundation of our earth. What this is composed of is as much a matter of mystery to-day as when Job was asked—

"Where wast thou when I laid the foundations of the earth? declare, if thou hast understanding.

Who hath laid the measures thereof, if thou knowest? or who hath stretched the line upon it?

Whereupon are the foundations thereof fastened? or who laid the corner-stone thereof?"

The only reasonable conjecture offered by science has been noticed under Chrysaor; this supposes that it was, or is, of a crystalline or vitreous character, that is, composed of the elements themselves in a pure or virgin state,—a surmise to which mythology adds some weight by asserting that Vesta remained a virgin goddess.

Demeter.—The derivation is suggestive in itself. What is δᾶ μήτηρ, "mother earth," but the materials from which are derived the rocks and clay that make our earth, our soil? And those are silica, alumina, soda, potassa, lime, magnesia, iron oxide, and other oxides of the elements, all well recognised rock-makers. Silica, for instance, is the base of all the quartzose or arenaceous rocks that comprise nearly one-half of the earth's crust; alumina, "the clay rock," as it is otherwise called, is the base of clay, mica, slate, and feldspar, and next to silica ranks most abundantly in the earth's crust. It is easy to see how those *oxides of the elements* personified by Demeter would come to signify the source of all soil, and hence of fertility and civilisation, as typified by the Roman Ceres. We never find rocks composed of the pure elements themselves,—for which reason mythology has made Vesta a virgin,—but of their compounds, the oxides: we never find silicon in

nature, for instance, but we do find silica, pure as in quartz rock, or united with other oxides, as in the feldspar and mica of the granite. So with alumina, soda, and the other rock-makers of our crust.

Ceres, the Roman equivalent for the Greek Demeter, has been variously derived from *gero*, *sero*, and *cresco*. This last, as significative of *growth*, is the best of the three, and would admit of Ceres being one of the twelve Dii Consentes, since growth is as essential as stability to the operations of life. It is more than likely, however, that the Latins went to Greek fountains for the names of their deities, at least the most important ones; and if so, *κεράω* has much to recommend itself derivationally. It is another form of *κεράννυμι*, "to mix, to compound," and differs from *μίγνυμι* in implying that the mixture or compound is a chemical one. By such a chemical combination would the oxides be formed from the basic elements; by combination would the ingredients of the soil be mixed and agriculture flourish; by the same combination or union would law and civilisation be established; and finally, it would be owing to mixture, combination, or union of some kind or other that growth would come.

Hera.—If Vesta then be a foundation composed of pure elementary substances, and Ceres be the oxides of those elements, what is there naturally and logically left for Hera to personify but the mixture of those oxides with one another? Rocks composed of one mineral alone are very few, since most are constituted by a mixture of different minerals, and it may be said that the land, as opposed to water, is a compound. Vesta appropriated the elements; Ceres, the oxides of those elements; *Hera* or *Juno* symbolised the compounds of those oxides, *the solid land*. The derivation, *ἄρω*, "to join," points to the same conclusion; so do such cognates as *ἔρα*, "the earth," *ξηρά*, "the dry land;" so do the Latin *terra* and the English *earth*. Again, the Latin form, Juno, is from *ζευγνύω*, "to join," and Virgil in the *Æneid*, IV. 59, says plainly :—

"Junoni ante omnes, cui vincla jugalia curæ."

In virtue of her being so important a personage in classic literature, let us descant a little further on this queen of the gods. She has usually been supposed to be the personification of the denser or lower strata of the atmosphere. But her ancestry and kin, her power, her offspring by Jupiter, and her pictured representations do not warrant any such conclusion, even if the atmosphere were not already occupied by a Latona. Neither do many passages from the poets, unless sometimes after a very forced manner; while in other passages, such as where Virgil makes her descend into Hades to summon forth Alecto, and where Ovid does the same to call forth Tesiphone, it is impossible to retain "air" as the personification intended. But if we take Juno as "the land," we can follow the mythical track of the goddess from her birth to her union with Zeus or Life; can see why Youth and War and Birth (Hebe, Mars, and Ilithya) should spring from such union; can see why Heat (Vulcan), considered as force expended in the past by the contraction of *earth into itself*, may be considered as the offspring of Juno individually,—or why Heat, considered as force that has never been separated from some form of life, should be considered as the joint issue of Juno and Jupiter. We can, as Land, willingly assent to her being "*divum regina, Jovisque et soror et conjux*," especially when we allow Jupiter to symbolize Life; and, as Land, we can grant all the epithets applied to her, whether *saeva* or *sacra*, *alma* or *aspera*, *regia* or *sceptrigera*. We can readily understand how the land, which in geologic time has repeatedly sought the depths of ocean bed and descended by its own weight towards the nucleus of our globe, could be described thus by Virgil:—

"Flectere se nequeo superos, Acheronta movebo."—Æ. VII. 312.

We can give Ovid credit for geological lore and not poetic fiction when, on Juno's entering Hades, the poet says:—

"Quò simul intravit, sacroque à corpore pressum
Ingemuit limen."—Met. IV. 449.

We can also understand how the close association of land, from lowest vale to highest peak, with the surrounding atmosphere has led to the confounding of the divinity with the lower strata of air, and to whatever chance resemblance there may be in this erroneous personification. And as to other particulars, who can better be said to have fostered and brought up the land than Oceanus and Tethys, that sea which covered our globe at one time throughout, the thermal ocean of geology, the bed of which, peaking up here and there it may be above the waters, was destined to form the dry land later on? And what union can be more worthily dignified as the first or sacred marriage, the *ἱερός γάμος* of the myth, than the wedding of Land to Life? What see we more majestic and mature, with broader front, than this ox-eyed Juno, this *Bouvaía*, this Earth of ours, whose hills, "broad, round, and green," are described by Bryant as "Kindling with the spirit of the morning," and whose mountains are pictured by Rogers as "So ethereal as to belong rather to heaven than earth"? What but land, with its isles, its continents, and its Alps of every clime, can so influence meteorological conditions as to lay special claim in the summoning of an Iris, "with a wing on the earth and a wing on the sea"? And finally, what more jealous of Life and of the doings of Life should we or do we find than this same Land, ever the acknowledged partner of his couch and sharer of his secrets, but never, so long as air and water be, the sole partner of his affections?

Hades.—From the very beginning of the evolution of matter there appears a curious tendency to the formation of chasms or tunnels in the constituted mass. This has already been alluded to when mentioning the "rifts" observed in the great nebula of Andromeda, the "fish-mouth" in that of Orion, the "Key-hole" of Argo, and the "coal sacks" of other nebulae; of all which Gore has said, "It is not easy to understand how an opening through a gaseous mass can be kept open and prevented from closing up by fluid pressure." And as to our earth later on,

secular contraction has ever accompanied cooling, with the further consequences of intermittent upheaval and subsidence over irregular areas. During these subsidences of the outer shell on the inner nucleus, vast masses of matter would, in the effort at adjustment, acquire a greater vertical depth, would be crumpled, crushed, and abundantly fractured, would thus generate heat and chemical action sufficient in some cases to produce reservoirs of fused matter,—especially when underground water would find access to the intensely heated materials,—and would make the crust of our globe “a complicated network of fissures.” This hypogene action that takes place beneath the surface, due to the original internal heat and that portion of it which has survived, and those modifications which have been effected by its means in the internal structure and composition of the crust as a whole, are personified by *Hades*, the potentate of the unseen world,—whence his name, *a εἶδω*, “not seen,” according to some authorities. We may not see those changes all, nor be well cognisant of them, but what we do recognise adds to the horrors of what we do not.

His is a *rich* domain, this *Pluto's*, increased ever from without, a world interior fed from an outer one, for every thing, all three of nature's kingdoms alike, is going down slowly but surely towards the centre, meeting on its way Cerberus, “fame rabidâ tria guttura pandens,” one for the mineral, another for the vegetable, a third for the animal. All roads lead to Hades, the gates are ever open for admission and are situate but an inch or less beneath the surface; but egress there is none, for Hades may be called the “binder-fast” (*ἀεί δέω*).

And from those gates branch off avenues many and intricate, broad and narrow, intersected with rivers, lakes and stagnant pools, with springs of water clear and cool as crystal, with others reeking with the fumes of sulphur and mephitic gases, and with still others where waters bubble and boil and hiss with superheated steam. All these are in our earth, are lorded over by the autocratic Pluto,

the brother of Zeus, the undercrust of Life ; and here take place for flesh and woody fibre those curious and appalling changes that, when coolly and dispassionately brought before the mind's eye by geological prose, make the flesh creep and the soul shudder as never could a Virgil or a Dante.

Poseidon, the Latin Neptune, is as well recognised a personification as his brother, Pluto. Water may differ in specific gravity, salinity, dissolved minerals and gases, taste, colour, temperature,—in many other respects, according as it appears in the broad ocean or the solid berg, as it is found in gulf or lake, in chalybeate or other spring, in the river that traverses half a continent or the purling stream that meanders for a mile or two, in the interstitial water of our rocks, or in the aqueous vapour that descends from the clouds, that hangs as steam over a volcano, or that is erupted from a geyser. All these, whatever minor satraps may have power over them, acknowledge the sway of this Poseidon, this universal water that *drinks up the lands* (πόσις δᾶ) over which it flows. For our hill tops are battered and fretted and stripped by the rain, the snow, and ice ; our plains are denuded by the streams and rivers ; our coasts by the waves, and the débris of continents is received and swallowed by the great salt sea.

The Latin form, Neptune, may perhaps come from νη-πτύω, “that which disgorges not,” but νήποινος, “unpunished, free,” is preferable, the τ being merely euphonic, as we find it in πτόλις and πτόλεμος for πόλις and πόλεμος.

He is a mighty potentate, this Water, and with his trident, one tine of which is gaseous, a second liquid, and the third solid as the ice it stands for, has with impunity clipped and carved and hewn the surface of our globe, has shaped its outlines, and furnished the sinews whereby a Vesuvius is roused and an earthquake propagated.

CHAPTER IV.

LIFE.

Zeus.—Is it likely that the myths which personified matter and force and every variety of the two, would pass over Life?—That water, land, and air, that time, the sun, the moon, the stars, and all other phenomena connected with these, would each have its personifying word, and that Life, the Life for which all these earthy, aqueous, and celestial beings were formed, would be omitted or forgotten? Surely not. Genesis was written in the interests of life; Science has ever had, and still has, life for its aim in all that it searches out and evolves. Mythology, which has unfolded itself so far as a scientific record of creation and created works, *must* have a word personifying the idea. Nor is it difficult or puzzling to determine. The graven characters, commencing with a Chaos, proceed regularly, and systematically from this, the most simple condition of matter and force combined, down to that miniature Chaos, the parent nebula from which our universe was evolved, and further down to the formation of a firmament. We see in these the personifications of evolution, dissolution, light, and division into universes, our own included; of physical and chemical forces, of matter changed from a nebulous to an atomic condition, and of a boundary to our universe. But we find no life, nor do we expect to find it under such a constituted mode of being. Beginning with Uranus, the characters go on in an equally orderly and systematic fashion, from the formation of a firmament to the evolution in time of atomic matter into molecular and compound. Here we see the personifications of the celestial bodies, of aqueous vapour, a nascent atmosphere, arrangement of particles, of metallic, metalloid, and of compound bodies.

None of these is or could be Life. Still, we may now look for its appearance. But not as sky, land, water, or air, for these are already occupied by Uranus, Juno, Neptune, and Cœus. Life should be born *after* those, in order to have a habitat ; should be born *superior* to those ; be destined to *change* the old and establish a new order of things upon our globe, and be capable of reigning over earth and sea and air alike.

There is one, and only one mythical divinity who fulfils the required conditions, namely *Zeus*, born of Kronos and the youngest of his children, recognised as leader from the first, who expelled Kronos and effected change after change in both force and matter, and who was universally acknowledged as the most powerful among the immortals. The creative works trended towards and culminated in Life and in the highest form of life, man : the mythological divinities trended towards and culminated in Zeus, the father of gods and men. What have we greater than Life ? And than Zeus—what greater deity have the myths ? None,—as Ovid makes Sol thus declare to Phaethon :

Vasti quoque rector Olympi,
Qui fera terribili jaculatur fulmina dextrâ,
Non aget hos currus : et quid Jove majus habemus ?

Met. II. 60.

The very derivation is convincing. We find ζῶω, "to live," and can trace the curious genitive Ζηνός to the infinitive ζῆν of the same verb. The Latin Jupiter is probably Ζεὺς πατήρ, "father Life," and its genitive Jovis but a form of ζῶός, "living."

Remembering how intimately associated life is with law and civilised being, we can understand the appropriateness of all such epithets as ἀγοραῖος, ἐρκεῖος, ὄρκιος, ξένιος, and many other phrases, as "father of men and gods," "counselling Jove," "far-seeing Jove," and the like, when applied to Zeus, epithets which have little or no significance when applied to air, fire, the sky, fate, or any other material or immaterial existence supposed to personify the divinity.

And what but Life could be the spouse of Juno, the land, of compound inorganic matter, and therefore a type of organisms, all of which are compound in their nature? So, too, we can trace this *life* through the children begotten of Zeus; through the Horæ for instance, that marked the seasons of life, the spring, summer, and winter of life as well as of the year; through the Mæræ, the destinies that shape life from opening to close; through the Charitæ or Graces, the physical, intellectual, and moral beauties that tend to refine and civilise life; through Minerva, the organised or guarded strength derived from life's experiences and troubles; through Persephone, the seed wherein latent life resides for the third of the year in which Hades claims his bride; through the Nine Muses, that surely can be ascribed to nought else than life. And so on indefinitely. Whenever and wherever Zeus or Jupiter is mentioned in the classic poets, there we must look for *Life*, and there we shall find it either as manifested in organic being or as affecting inorganic bodies and the earth as a whole.

In many cases, indeed, the interpretation is absolutely thrust upon us by the poet. Thus, to take Horace alone, what else than "life" can be rationally deduced from the following in his Odes:

Seu plures hiemes seu tribuit Jupiter ultimam,
Quæ nunc oppositis debilitat pumicibus mare
Tyrrenum, sapias, vina liques et spatio brevi
Spem longam reseces.—I. xi. 4.

Pone me pigris ubi nulla campis
Arbor æstiva recreatur aura,
Quod latus mundi nebulae malusque
Jupiter urget.—I. xxii. 17.

O decus Phœbi et dapibus supremi
Grata testudo Jovis.—I. xxxii. 13.

Regum timendorum in proprios greges,
Reges in ipsos imperium est Jovis.—III. i. 5.

The researches of geology have brought the record of life in an unbroken line from the most recent of the Post-tertiary rocks down to the Cambrian, the oldest of the Palæozoic. In these Cambrian rocks, consisting of slates,

flags, sandstones, and conglomerates, we find representatives of the vegetable kingdom, chiefly as fucoids ; and in the animal we find abundant remains of Protozoans, Radiates, Mollusks, and Articulates. So great a profusion of life, indeed, is there, that Agassiz says, "It would seem as if God, in the joy of creation, had compensated Himself for a less variety of forms in the greater richness of the early types." Under the Cambrian lies what is called the Archæan series of rocks, consisting of granite, gneiss, schists, limestones, &c. "That they are separated by a vast interval of time from the rocks which lie upon them is shown by the strong unconformability with which they are related to every formation of younger date than themselves. Everywhere thoroughly crystalline, they are disposed in rude, crumpled, often vertical beds, out of the ruins of which the overlying formations have been partly built."

Their thickness is unknown, though an approximate estimate of from 20,000 to 30,000 feet has been conjectured for them ; they are supposed to overlie the molten interior of our globe ; and nowhere, with one supposed exception, has any vestige of life been found among them. In continental Europe they crop to the surface in Scotland, Scandinavia, Finland, Russia, Bohemia and Bavaria, in the Ural Mountains, the Carpathians, and the Alps. In North America, where they have been divided into an upper or Huronian and a lower or Laurentian series, they range from Nova Scotia westwards to the base of the Rocky Mountains, and appear along the central parts of the Rocky and Appalachian ranges. The Laurentian or lower series consists chiefly of gneiss with bands of quartz rocks, schists, iron ore, and limestone ; and in the limestone here, as also in the Archæan limestone of Bavaria and Bohemia, has been found what is supposed by many geologists to be the earliest known fossil, and so far the sole representative of life in the Archæan rocks. It has been called the Eozoon, and is supposed by Dawson, Carpenter, and others, to be the remains of a massive foraminifer that grew in large thick sheets over the sea bottom.

Apart however from this disputed Eozoon, the bulk of unproved testimony is in favour of believing that life existed, and existed abundantly, in Archæan times, notwithstanding the great heat of land and sea and air alike, and that its visible absence is due to the intense mechanical and chemical agencies of that early period having so metamorphosed the organisms as to defy any methods of proof or any instrument as yet known to science. Lyell reasons thus: "We ought not indeed to marvel at the general absence of organic remains from the crystalline strata when we bear in mind how often fossils are obliterated, wholly or in part, even in tertiary formations—how often vast masses of sandstone and shale, of different ages, and thousands of feet thick, are devoid of fossils—how certain strata may first have been deprived of a portion of their fossils when they became semi-crystalline, or assumed the *transition* state of Werner—and how the remaining organic remains may have been effaced when they were rendered metamorphic. Some rocks of the last mentioned class, moreover, must have been exposed again and again to renewed plutonic action."

Winchell too:—"These underlying crystalline masses are not confined to the deep-seated regions of the earth's crust. We find them thrusting their heads up through the ruptured strata which repose upon their flanks: higher than the highest summits formed by the stratified rocks do those foundation masses rear their bold giant heads. Some of those venerable domes may be supposed as having been reared before a particle of sediment had been produced, or before even the world-embracing sea had descended from the regions of space around the earth, and as having watched the procession of all subsequent events. Others were the level floor of the ocean when the oldest sediments began to accumulate upon them. In some subsequent period a mighty force has raised them with their load of sediment above the level of the sea,—to be partially stripped of their sedimentary coverings by tempests, or to break through tension into chasms from

exposed top to the molten base below, and permit the fiery sea rise to the lips of the fissure, or even to overflow in a consuming and terrific flood of lava. The same course of events may have occurred beneath the waters of the sea, with the same results, and an entire oceanic basin may have been converted into a seething caldron in which seed-weeds, corals, and all living forms have been destroyed—cooked as it were.”

Among some of the many reasons for inducing belief in the fact of organised vegetable existence during Archæan time, the following may be interesting :

1. Vegetable life can flourish under conditions of abnormal heat and cold. We behold plants making their habitat in the hot springs of California, the Geysers of Iceland, and the snows of Greenland. Infusions of living matter, boiled at a temperature of 212° Fah. for two hours, and then kept in hermetically sealed glass vessels, have shown the presence of living infusoria after a few days,—thus proving the tenacity of life in the germs.
2. Vegetation can flourish in abnormal situations. The masses of floating hyacinths that choke the bends of the St. John's river in Florida and the Mississippi of Louisiana furnish an instance of profuse vegetation not requiring soil. So, too, does the seaweed in that part of the Atlantic known as the Sea of Sargasso, which extends from west longitude 45° to 70° .
3. Large quantities of graphite—a mixture of carbon with a small proportion of iron—have been found in the Archæan rocks, and this graphite is supposed to be due to the deoxidation of carbonic acid by the vegetation that flourished in this age.
4. An equally remarkable characteristic of the Archæan rocks is the prevalence of iron ore. Hæmatite and titaniferous iron, magnetic and iron sulphides are everywhere found in the crystalline schists, sometimes to 200 feet thick. Dr. Sterry Hunt considers these masses of ore as proving the precipitation of

iron by decomposing vegetation during Archæan time,—and on a grander scale, he asserts, than at any subsequent geologic period.

While Palæontological Geology, then, has come to a halt at the crystalline schists, it is in favour of believing that some forms of life had existed during the Archæan Age, that the earliest form was probably vegetable, that abnormal conditions of heat, etc., might be counter-balanced by abnormal structure, and that the presence of graphite and iron ore in those early formations strongly favours such belief.

The Mythology which has personified life by Zeus would seem to corroborate this opinion. We have identified Asteria with the Crystalline Schists, and noted how Zeus, then a lusty wooer, forced her to seek refuge from his advances in the depths of ocean. Farther, much farther back than this Asteria may we go and still find evidence of Zeus or life. Chrysaor, the personification of the first covering worthy of being dignified as the primeval crust of earth, was born of Medusa, and she was decapitated by Perseus, who was born of Zeus. This brings us to the “Golden Age” of mythology, the conditions of which have already been described, and the duration of which embraced the vast length of time occupied by our earth from an incandescent state to one admitting of a crust upon the molten surface. That the myths have pushed back Zeus to so early a period is evident enough. Ovid, when writing of the Golden Age, alludes to life as just opening, or “patulous,” at some time during this period:

“Et quæ deciderant patulâ Jovis arbore glandes.”

Virgil, in the Georgics, alludes to the same age—first, as it was before life:

- 1 Ante Jovem nulli subigebant arva coloni:
Nec signare quidem, aut partiri limite campum
Fas erat: in medium quærebant: ipsaque tellus
- 4 Omnia liberius, nullo poscenti, ferebat.—I. 125.

And then, after life :

*Ille malum virus serpentibus addidit atris,
Prædariusque lupos jussit, pontumque moveri,
Mellaque decussit foliis, ignemque removit,*

8 *Et passim rivis currentia vina repressit.*—I. 129.

Previous to life no hills pressed down the plains ;
Not possible it was to trace or bound
The wide expanse ; all things the centre sought ;
And earth itself, with none to say it nay,
Too lavishly expended all it had.
To the foul dragons life their venom gave,
Made wolves rush forth, and sea translated be,
Shook down the honeyed rain drops on the schists,
Moved back the fire, and checked the lava red
That everywhere in rivers swiftly flowed.

NOTES.

- 1 *coloni.*—The Greek *κολωνός*, “a hill.”
- 3 *nec fas.*—A fused condition of our orb admitted of no bounds or marks.
in medium.—It was the stage when gravitation of matter from the surface to the centre was most active.
- 4 *nullo poscenti.*—There was no life as yet ; and radiation of heat and light went on apace (*liberius*).
- 5 *malum virus.*—Life brought the rain, and water at first added but venom to the flames (*serpentibus*). Furthermore, it is the water that actually gives their strength to poisonous substances : remove their water from nitric and sulphuric acids, and they become more or less inert.
atris.—The colour had changed from the original “golden” to a more or less *dark* hue, owing to the radiation of heat and onset of the rain. Molten metal or mineral changes with cooling from a white, through various grades of colour, till the natural tint is assumed.
- 6 *lupos.*—The eruptions of igneous matter that every now and then ruptured the crust and played havoc with the still tender formation.
pontum moveri.—From the regions above to earth below.
- 7 *foliis.*—The *foliated* or *schistose* rocks.
ignem.—The central fire was more and more encroached on and confined by the external crust which life assisted so much to form and to strengthen.
- 8 *vina.*—The torrents of liquid lava from volcanic eruptions.

It is impossible to know the precise reasons which induced the framers of mythology to predicate so early a date for

life. They may have done so guided by purely theoretical reasoning, or through information derived from practical scientific research. We must not hastily judge with regard to the possibility of this latter supposition. We find them, contrary to what has been imagined, well acquainted with the nebular hypothesis, the doctrine of evolution, the essential truths of matter and of force, and with many of the intricate points in the geological formation of our globe. How much further they went in the field of investigation cannot be said, but it is well to remember always that they had the benefit of the ages, and of the learning of some of the greatest intellects the world has yet seen, and that the Greek mind was ever acute and persistent in the acquirement of knowledge. But apart from this, theory alone may have led them to the same conclusion, and just as we deduce a possible and probable life in the Metamorphic rocks from the presence of graphite and iron ore, so may they have reasoned out life as capable of existence at a still earlier date—from the first appearance of the carbon element itself.

Graphite is carbon, sometimes crystallised, sometimes compact, and generally found mixed with a varying proportion of iron. The diamond is almost pure carbon, and always in the crystallised condition: it is often associated with the quartz that enters so prominently into the composition of our oldest rocks, the gneiss and granite, and is generally sought for in the "pans" or "pipes" of a circular form that run down into the inferior strata and are filled with a peculiar igneous rock called diabase or gabbro. The strong supposition is consequently that the rocks among which diamonds are found are not the mother rock in which they were originally formed, but that through volcanic agencies they have been brought up from the very bowels of the crust through those "pipes." Nor is the plant origin of the diamond an unknown or new theory. Newton supposed it to be "an unctuous substance coagulated"; Jameson and Brewster traced it to vegetable sources; Lavoisier noticed the black specks in diamonds when burned,

and ascribed them to uncrystallised carbon ; Petzhold and Goeppert affirmed the presence of vegetable cells in its ashes ; and the general opinion to-day is that nothing precludes the idea of the diamond having originally been some peculiar vegetable product, subsequently altered and crystallized

Actuated by their knowledge, then, that carbon is the one essential constituent in organised being, the ancients may have simply pushed our own theory further, and based the inception of life not with the later graphite of the Metamorphic but with the earlier diamond of the unstratified rocks.

This is strongly confirmed by that portion of the myth which introduces the Idæan Dactyli in connection with the infant Zeus.

Excluding a very small proportion of mineral matter or ash left after burning, the entire mass of vegetable and animal forms is made up of only four elements, viz., carbon, oxygen, hydrogen, and nitrogen. But, while we find all four in the most complex and highly organised of vital products, the albuminous group, we find only three in the simplest of organic substances, such as starch, sugar, and woody fibre ; and these three are carbon, oxygen, and hydrogen,—the *ternary group*, as they are called.

Now, the Dactyli too were originally three in number, namely, Celmis, Damnameneus, and Aemon ; their title, Idæan Dactyli, is synonymous with our phrase, “the ternary group,” for *ιδέα* means “a class, a group,” and *δάκτυλοι* signifies “fingers, dactyls, anything consisting of or proceeding by threes,”—(each finger having three joints),—and hence *ternary* ; and just as C, O, and H are the custodians of infant life, so were the Dactyli appointed as custodians of the infant Zeus. Equally must we affirm of our ternary group that which mythology affirms of the Dactyli, namely, the discovery and working of iron. This metal is never found pure in nature, but always as ore ; so that, were it not for those discoverers, C, O, and H, we would have no iron carbonate (Fe CO_3), nor ferric oxide ($\text{Fe}_2 \text{O}_3$), nor ferric hydrate ($\text{Fe}_2 \text{O}_3, 3\text{H}_2\text{O}$) ; and were it not

for the same C, O, and H, it would be impossible to work and smelt the iron ores in those blast-furnaces of to-day, which are but miniatures of the great natural furnace in earth itself. Such marks of similarity are almost conclusive in themselves towards establishing the relationship between the Idæan Dactyli and the ternary group of carbon compounds; but all remaining doubt must vanish with the open assertion that one of the mythic group is identical with one of the scientific, since it is but logical to infer that "from one we may recognise all." Ovid furnishes this assertion in the following lines, and they have the additional merit of proving that Zeus is life, and that life's earliest form can be traced back to the existence of the diamond:

Te quoque nunc adamas, quondam fidissime parvo,

Celme, Jovi * * * * *

Prætereo.

Met. IV. 281.

Thee too, O Celmis, diamond of to-day,

Most true of yore to infant life, I pass.

If Celmis, then, be the diamond—pure carbon—what else can his brother Dactyli be except oxygen and hydrogen? Each name, too, is pregnant with the chief characteristic of the element it represents, and breathes a significance that is notably lacking in the modern term. Thus pure carbon, as being the hardest of known substances, is styled Κέλμης, "notable or noble strength" (καλός ἰς, the μ being inserted for euphony as in ὄμβριμος for ὄβριμος); oxygen, the most abundant and dominant of the elements, and one which combines with every simple body save, perhaps, fluorine, is called Δαμναμενεύς, "the conqueror, the tamer, the one that yokes or combines" (δάμνημι), and Youman voices the mythical idea when he writes thus of oxygen, "enveloping our planet in its free condition, it manifests an irresistible passion to seize upon and possess all things"; and finally hydrogen, the lightest of all known substances, and hence the most volatile, has been called Ἀκμων, "reaching to the highest point" (ἀκμή ὤν).

Increasing the number of Dactyli from three to five, ten, &c., can be readily accounted for by making use of the

original three as a compound radical. Thus starch ($C_6H_{10}O_5$) becomes grape sugar ($C_6H_{12}O_6$) by the addition of H_2O or two new Dactyli, differing essentially from the other three inasmuch as it is by their agency that the change from starchy to saccharose matter has been effected. If to these five complete or male Dactyli ($C_6H_{12}O_6$) we add as many more, but incomplete or female ($C_6H_{10}O_5$), we get ten Dactyli, the representatives of $C_{12}H_{22}O_{11}$ or cane sugar ; and so on indefinitely.

All this impresses the belief that a well-grounded knowledge of chemistry, its symbols, notation and laws, existed among the ancients, and that this knowledge was very old. What we read concerning the Cabiri but strengthens the conclusion, since all the details connected with these mysterious divinities can be explained intelligibly in no other way save by studying them from an organically chemical point of view. They are said to have been descended from the Dactyli according to some accounts, or from Vulcan according to others ; and in either case their chemical origin is pointed out, emphasised as it is by saying that they were proficient in the art of metallurgy. Like the Dactyli, they were originally three ($C_1H_1O_1$), were afterwards increased to four ($C_1H_1O_1N_1$), and like the Dactyli, they can evidently be increased to any number by the system of compound radicals. They are beneficent or malevolent as the case may be, as much so as alcohol (C_2H_6O) is ; or the white of eggs and its isomeric mate, the venom of rattlesnakes ; or as glycerine and nitro-glycerine, &c. They are closely connected with Rhea (the operations of early earth), Demeter (the oxides of the elements), with Zeus, Minerva, and Venus, (life, organisation, and affinity), and with Hermes, (the flux, fusion, or solution whereby chemical changes are facilitated). They are potent over growth, over the vine, the grape, the saccharine matter of the grape, and alcoholic fermentation ; and hence it is that they promised wine to the Argonauts, and that in conjunction with life and genial warmth (Zeus and Apollo) they were invoked by the Pelasgians in a time of dearth.

Emblematic as they are of strong affinity and the closest union, they were naturally invoked by lovers and appealed to for vengeance by the slighted ; being the embodiments of life, and constituting water (H_2O) in the proper proportions, as two of them always do in the ternary group, they were called upon for help in all perils to that life from the sea and otherwise ; and to describe them as dwarfs with protuberant stomachs is but a ludicrously correct word-picture of the symbols as presented by the protuberant combining volumes when attached to the simple elements, as thus, $C_6H_{10}O_5$ (starch), $C_{27}H_{22}O_{17}$ (tannic acid), and these must yield in the way of obesity to albumen, which has been stated as $C_{72}H_{110}O_{22}N_{18}$, with a trace of sulphur. Their names too have a chemical flavour. 'Αξίερος signifies (ἄξιος ἔρος) "noble or notable force," and, though differently garbed, is thus the exact synonym of Celmis, or the carbon ; 'Αξιόκερσα and 'Αξιόκερσος denote (ἄξιος κεράω) "noble or notable chemical union," that is, of hydrogen and oxygen in the proper proportions for forming the water (H_2O) which is so essential to animals, vegetables, and even to minerals, and on whose various qualities depends the very stability of nature ; Κάδμιλος or Κάσμιλος (from καταμελέω, "to care not, be indifferent," or Χάσκω μέλος, "the sluggish member") has peculiar reference to the *inert* characteristic of nitrogen ; and finally, all four combined, C, H, O, and N, would be the Κάβειροι, or by metathesis the Κάρβειοι, that is, would be "the carbon compounds" (κάρβων).

As the knowledge of chemistry involves a high degree of intelligence and information, and as its votaries have been proverbially looked upon with suspicion by the uneducated, it is very significant to read how the cult of the Cabiri was generally associated with that of Hecate (mental elevation), how the rites were celebrated for nine days (a *ternary* period), at night and with great secrecy, and how it was openly intimated by some writers that the mysteries of the Cabiri were particularly, calculated to protect the lives of the initiated. Still more significant of "the Black Art" are these words of Herodotus, who was born 484 B.C.,—

and if we read "test tubes for solution" in place of "phallic Hermæ," we will be true to the simile and to the context: "The Athenians received their phallic Hermæ from the Pelasgians, and those who are initiated in the mysteries of the Cabiri will understand what I am saying; for the Pelasgians formerly inhabited Samothrace, and it is from them that the Samothracians received their orgies. But the Samothracians had a sacred legend about Hermes, which is explained in their mysteries."

When we come to those other entities, the Telchines, we find that chemistry is still the theme, and that the term embraces in a sense all the elements with their simple combination into acids and bases.

The names would certainly warrant this conclusion. Argyron, Chrysaon, and Chalcon point unmistakably to silver, gold, and copper; Hormeneus, Mylos, and Simon are equally manifest as mercury (ἐρμῆς), lead (μόλυβος), and antimony (στίμμι); Lycus exhibits the characteristic luminosity (λευκός) of phosphorus, and Atabyrius (Ἀτάβυρος) points to "the pest of fire" (ἄτη πυρός) or sulphur which is found native in volcanic regions, and which itself is probably but (δολός πῦρ) "the plague of fire"; the peculiar crackling, or "tin cry" as it is called, given out by tin when bent, is as visible in the Greek Antæus (ἀνταύω "to sound back") as it is in the Latin *stannum* (στένω "to cry"); Megalesius is (μεγάλος ἄλς) the type of our halogens or salt-formers, and consequently may stand for chlorine, or sodium, or for both; and Nikon is left for iron, the symbol of victory (νίκη) among the ancients, the symbol of victory to-day when iron has proved the universal conqueror,—in war, agriculture, navigation, mining, manufactures, trade, travel, and the press.

As to their origin, it must be remembered how, when the world was incandescent, everything that was volatile was driven to the outskirts by the intense heat, and how as a consequence the constituents of air, ocean, and of the crust itself, were not on but above the earth as a vast nebulous or misty envelope. In this nebulous ocean were the elements

evolved, and here did the first instances of oxidation occur, that of oxygen with hydrogen, to form the primal rain, and of oxygen with carbon, sulphur, phosphorus, &c. to form phosphoric, sulphuric, carbonic, and other acids. The Telchines may therefore be considered as descended from this gaseous sea, or from Thalassa. And when the rain did fall, it "did not fall alone," to use Gunning's words; "the primal atmosphere was loaded with other vapours, with all that was vaporisable,—and chlorine, sulphur, carbon (as acid gases), and other volatile vapours, all mixed with aqueous vapour, filled the original atmosphere. The rain washed down those vapours and acids, which entered into combination with certain bases, and loaded the sea as they had loaded the air." Hence it can be seen why some writers would describe the Telchines as sprung from this primal water, or Poseidon.

It is for this reason, probably, that they are called *Θεαγίνες*, "the sea-born" (*θάλασσα γένος*); still, if *θέλγω* ("to charm, bewitch, to change" as in sorcery, "to enchain" by imperceptible but overwhelming force) be older than *Θεαγίν*, it would be an apt derivation for the chemical transformations personified by the Telchines. The form *Τελχίνες*, if not equivalent to *Θεαγίνες*, would signify (*τέλος ἐχέιν*) "reaching towards the end, putting the finish to," since the evolution and oxidation of elementary matter would be the final stage of the unknowable, and the beginning of the knowable,—and the distinction of incipency as well as of finality is connected with the use of *τέλος* in some instances.

Their origin and the naked simplicity of the elements, as also of the acids and bases as a rule, (S, P, CO₂, NO, &c.) are denoted in the myth by calling them marine beings without feet, and having fins for hands,—a simile which points to the small combining volumes, and is evidently in harmony with that which makes the large-atomed nitrogenous compounds "pot-bellied."

The comparison of these oxides to Actæon's dogs is a forceful simile, for we all go a hunting in the hey-day of our youth, one after power, another after love, a third after

riches, a fourth after knowledge, and still another after something else ; and coursing with us goes this oxygen which Huxley calls "the great sweeper" of the body, and which Eustathius has likened to "a pack of hounds." Each dog serves us faithfully and well, and answers responsively to every cry and whispered breathing we may give. Breaking cover at the bronchi they nose through every ramification till they scent and lap the dark blood in the vesicles of lung tissue, and reeking now with arterial red they hasten in full cry to the heart, thence to the aorta, and from there to every muscle, bone, and vessel of the frame, keen meanwhile to search for and snap at all that is torpid and effete within us. We cheer them on, the chase grows hot, and at last it may be that we hunt the quarry to its lair,—only to find that the glamour of youth has gone and that we see more clearly the nudity and nullity of things terrestrial. Age has come during the chase, and with age reflection, the Diana of the mind. We would gladly lie down and rest, but the oxygen pack is as eager as before and cannot be restrained by muzzle or by leash. We care no longer for the hunt ; and so these dogs, for want of better game, turn savage on their master and hound him to his death. "When," says Steele, "there is plenty of fuel in our human furnaces, the O burns that ; but if there is a deficiency, the destructive O must still unite with something, and so it combines with the flesh ;—first the fat, and the man grows poor ; then the muscles, and he grows weak ; finally the brain, and he becomes crazed. He has simply burned up, as a candle burns out to darkness."

As the phases of each element are distinction, oxidation, and further change,—or, as some may prefer, change, distinction, and increasing density, the Telchines are said to have gone from Crete (*κρίνω*—*κριτέον*, "rendered distinct") to Cyprus (*κάππυρος*, "burning," and oxidation is combustion), and thence to Rhodes (*ῥέω ὁδός*, "changing ways") ; or from Rhodes to Crete and thence to Bœotia, an emblem for sluggishness or density. But the Rhodes that typified

the endless chemical changes going on in matter owing to the combining and liberating action of oxygen, was their favourite abode, and hence we may consider them best under the aspect of oxides.

As such, and in conjunction with Capheiro, the daughter of Oceanus, they would help in bringing up Neptune, if we only suppose this Capheiro, the offspring of aqueous vapour, to represent hydrogen. Thus, if the Telchines calcium oxide, carbonic acid, and chlorine be united with hydrogen so as to form $\text{Ca CO}_3 + 2 \text{HCl}$, we find them so far mindful of their charge as to bring Neptune (H_2O) up in the reaction which ensues, $\text{CO}_2 + \text{CaCl}_2 + \text{H}_2\text{O}$.

As such too they admit of ready explanation under each of their three apparently different aspects :

1. What better cultivators of the soil can there be than lime (CaO), gypsum (CaO, SO_3), carbonic acid (CO_2), potash (K_2O), salt (NaCl), magnesia (MgO), &c.? These simple oxides are Telchines that mix with the decaying rocks and pass as cultivators into the soil, whence they are taken up by plants, stored away in seeds or stalks, and through this vegetable medium serve as ministers to the wants of animals and men.
2. Silver nitrate (AgNO_3) is the basis of photography, as PbO is of paint, and K_2O of soap; were it not for mercury, the thermometer, barometer, and mirror would be wanting or imperfect, and gold and silver would be scarcer for lack of an amalgam; were it not for other useful and inventive Telchines, glass, matches, gunpowder, dyeing, printing, and many other arts and manufactures would not exist. Again, it is of gold, silver, copper, their alloys, and of marble (CaCO_3) that our statues and costliest monuments are raised; it is copper and zinc that work in brass, just as it is iron that produces the wrought variety, the malleable, and steel. The trident of Neptune is but water in its three forms, solid, liquid, and gaseous, and since this water (H_2O) is but an oxide of hydrogen, the Telchines must have fabricated it. Equally is it

evident that they made the scythe of Kronos, for all things perish through decay, and decay is but another name for oxidation.

3. As sorcerers they are unrivalled, and compared with them Merlin was a bungler, the Cappadocian Apollonius a charlatan, and Pharaoh's wise men but tyros. Transformation was their pastime. The Telchin oxygen could assume two shapes, as ozone and ant-ozone; carbon could change to three, the diamond, graphite, and charcoal; sulphur figured under four forms; and so on, for we have a dim idea that they, one and all, are allotropic. Phosphorus was perhaps the greatest adept of them all, since by some indescribable hocus-pocus he could appear under six different aspects, as viscous, crystallised, transparent, white, black, and red. What they practised on themselves they practised upon others. They changed H_2 to H_2O , and brought it down as rain, snow, or hail; they transformed C to CO_2 and a gas resulted; this they squeezed and it became a liquid; and this again they exposed to the air and it was rendered solid; they threw lime upon it, and marble fit for building came forth. Gold had bragged, unfortunately for himself, that he was the king of metals; the Telchins Cl and O_5 waved their respective wands over H and N_2 , sprinkled some water upon the latter, flung the product upon the monarch, and, presto! the king was dead. They joined the solid yellow sulphur to the equally solid black carbon, and, like magic, the colours and solidity disappeared and a clear colourless liquid, carbon disulphide, took their place. Again they took the sulphur, oxidised it to SO_3 , added some Stygian water, and sulphuric acid (H_2SO_4) appeared, most powerful of all others, and a mortal foe to the living tissues of animal and plant. In a peculiar degree were they possessed of "the evil eye,"—a phrase handed down from remote antiquity, and one that probably owes its origin to these Telchins of old. Those eyes

were hydrogen and oxygen, the only two that unite with other elements to form acids, all of which have a characteristically sour taste and a more or less corrosive and deadly action. These qualities they owe to H and O, for if we remove the eyes from HCl , CO_2 , HNO_3 , H_2SO_4 , P_2O_5 , &c., we have the simple and harmless elements remaining.

There is every reason to believe that at an early period of our globe's existence, when the elements exulted with the joy of being and thirsted greedily for combination after combination, when heat and darkness were at a maximum and cohesion at a minimum, those Telchin sorcerers used earth and the envelope of earth as a vast laboratory wherein to practise their unholy spells and too rapid transformations. Is it to be wondered at, then, that they were hateful to the gods who stood for progress and stability? It is true that some few Telchins were adjuvants to the infant Zeus, and had much to do in the bringing up of rust, blight, smut, mould, mildew, and hundred other microscopic forms of fungous growth, the creatures of quick change, and yet the pioneers of life. But as an acid group they were too corrosive, too changeful, and too antagonistic to organised existence to suit the designs of a Rhea yearning for a solid crust, of an Apollo longing for an atmosphere simpler, purer, and permanent in elementary proportions, of a Zeus who aimed at being the father of gods and men; and so, as the myth tells us, cohesion, light, and life were hostile to these magicians from the first, and the same hostility subsists to-day. When Zeus, then, took on a soul superior to the microscopic fungi, and when Apollo succeeded in transmitting the first wan wisps of light (or "wolf-light" as the story goes), the night of sorcery was ended. The sunbeam, itself a powerful wizard but a kindly one, dispelled the darkness and fostered vegetable life; life in its turn brought cohesion; and the rain, attracted by vegetation, came down in a steady flow to purify the atmosphere from its acids, to temper the heat, give stability to all, and keep chemical transmutations within proper bounds.

While the chemistry of life is thus portrayed in the Dactyli, Cabiri, and Telchines, the purely physiological aspects of the same life are dwelt upon in other myths, that for instance which brings in Amalthea, the nymphs, and the Curetes.

Zeus, we are told, was begotten “ἐν ἄντρον τῆς Δίκτης.” To translate this as “in the cave of Dicte” is true enough in a sense, but not very intelligible. If we bear in mind that Δίκτη (evidently but another form of δάκτυλος, both being derived from δέικνυμι) is but the Dactyl or ternary group, and translate the words as “in a cell of carbonaceous matter,” the meaning becomes perfectly clear, since our cellular theory teaches that vegetable life springs from a cell whose walls are composed of carbon, hydrogen, and oxygen, and that all living tissues and structures are built from the metamorphoses and union of cells. This cellular theory—a very old one, since Hesiod distinctly alludes to it—is referred to in many ways connected with the infant Zeus, as we shall see presently.

The three most important functions belonging to early plant life are germination, absorption, and secretion. While there is much that is known and capable of explanation regarding each of these, there is also much that is puzzling—especially so when we come to their principia. When we ask ourselves, “How does a dry seed stored away for years still retain the power of germination? Why does the root invariably go down, not up? And why does each seed flourish, blossom, and bear only after its own kind?” we find that we have played the *quid nunc*, or *νῦν φῆ* once too often, and must take for answer, “such is their nature, their essence,”—the modern adaptation of the mythical phrase, “they are nymphs.” We can and do theorise of course, and may assert that germination, taking it as an instance, is the product chiefly of cell development, or moisture, or solar heat, or atmospheric influence, or of the conversion of starch into sugar, and so on. Our theories are old, as old as the myths themselves which personify this mysterious germination as the nymph Amalthea (ἀμαλός

ἀλθέω, "tender or embryonic growth"), and ascribe her parentage to Olenus (ὀλή, "the court round which the house itself is built," and hence, a cell), or to Oceanus, or to Helios, or to Hæmonius (ἄημα, "air in motion"), or to Melisseus (μέλισσα, "honey"). As germination is followed by shooting—the radicle going down and the stem up,—and absorption of the sap, so too is Amalthea followed by a goat (αἶξ—ἀίσσω, "to shoot"), and with its milk or sap is the necessary nutriment furnished to the infant Zeus. Some writers, like Apollodorus, ignore the distinction between germination and shooting, and so make the goat, under the name of Amalthea, stand directly for germination, and its milk, as before, for the sap. That germination is intimately connected with cell-growth is pointed out by the poetical appellation "Olenia capella," "the cellular germinator"; and the irresistible power of germination is equally marked by the term "Adamantea"—or this last may have reference to the diamond or pure carbon, as being the first representative of inorganic matter in which budding or germination occurred.

With Amalthea for germination, it naturally follows that Adrastia and Ida are the respective representatives of absorption and secretion. Both processes are connected with germination, are mysterious in their simplest aspects, spring into active being with the first change of starch into sugar, and nourish infant life with sap: Adrastia and Ida are connected with Amalthea, are nymphs, children of Melisseus, and feed the infant Zeus with the milk of Amalthea. The absorbing agent we call the *radicle*, and the Greeks Adrastia, since it is the paramount portion which, like a root in language, *runs no further* (α διδράσκω),—or that part of the plant which, unlike the stem, does not run away from earth. "The embryo is stamped with a *polarity*—a tendency to develop in opposite directions; one part is to live in the earth, the other in the air." The secreting agent is that unknown property in woody fibre whereby the cells can so assimilate the sap as to make each plant grow, blossom, and bear fruit, *after its own kind*; and

this secretive individuality is well expressed by *Ida* (*ιδέα*, "a class, kind, pattern, type of the archetype.")

When we come to the *Curetes* we reach a somewhat more developed stage of vegetable existence than that denoted by *Amalthea* and the nymphs. The story of infant life reads after this fashion. Every perfect seed consists of a compact mass of starch and gluten, and securely wrapped in this lies the germ or embryo. Exposed to air, moisture, a proper temperature, and a suitable habitat, the seed swells, germination starts into being, and every portion is more or less simultaneously affected by the impulse. The gluten becomes diastase and dissolves the starch; the starch becomes sugar and is assimilated by the germ; the germ expands and develops into radicle and stem; the radicle absorbs crude sap which is quickly improved by mingling with the organised juices; the stem assimilates and secretes this sap.

This continues while the starch and gluten last; but when the store is exhausted, another stage of existence arrives, and a new train of phenomena appears. The stem is peeping above the surface, the embryo is now a child crying lustily for its wants, and a new force or process—not germination, for that ended with the last morsel of transformed starch—appears in order to satisfy those wants. This force is *growth*, the *Curetes* of mythology; for as growth is a gradual increase to maturity, or in other words, a filling process up to the completeness of development, so are the *Κουρήτες* "the satisfiers or fillers of early youth," (*κόρος* or *κοῦρος*, "fulness, satiety; a youth,")—and it is not very difficult to see our own "growth" in the slightly transposed form of the word, *κρουήτες*. Ovid tells us, what we all know, that growth is induced by rain, when he says "*largoque satus Curetas ab imbri*;" Strabo mentions how certain of the *Telchines* who assisted in the bringing up of *Zeus* were called *Curetes*; and this too we know, for it is such *Telchines* as H_2O (water), CO_2 (carbonic acid), H_3N (ammonia), and some other inorganic compounds that the growing plant takes in from the air and from the soil.

In a certain sense these Curetes are associated from the very first with life, as suggested in the myth, for the dry seed contains albumen (carbon, hydrogen, oxygen, nitrogen, sulphur, and phosphorus, in proportions not well determined), and the rudiments of the plant are in the embryo itself, "in some varieties so complete that the microscope reveals its structure—root, stem, and leaves," waiting for germination, and germination may be considered as embryonic growth. But properly speaking, it is when the stored matter of the seed is exhausted that true growth comes into active operation; it is only when the plant appears above the surface, armed with stem and leaf, that the Curetes are *ἐνοπλοι*, the stem being their spear, and the leafy covering their shield. If our simplest forms of vegetation were, as may be well supposed, the first representatives of life upon our globe, then some of these thallogens, such as the mushroom with its stipe and pileus, must have stood forth as striking illustrations of those armed Curetes.

The conspicuous office assigned them in the myth is as true as it is important. One of the chief requisites for growth is the elaboration of the sap by taking in carbonic acid from the atmosphere. This is done by means of the leaves, fronds, or thallogous expansion, as the case may be; and as the amount of gas taken in is always in proportion to the extent of atmospheric surface in contact with the leafy covering, it is evident that rustling of the leaves, by increasing the contact area, augments the amount of nutritive material. Whenever, accordingly, we see a plant whose swaying stem is setting its leafy covering in motion, or, to speak mythologically, when the Curetes strike their shields with their spears, we may be confident that nutrition and growth are going on apace, and can readily understand how the same rustling process which feeds the life within the cell is also satisfying the cravings of the infant and smothering its cry.

All the foregoing, the Dactyli, Cabiri, &c., are bits of science elaborated and incorporated with the myths in times later than those of Hesiod. They are important in many respects since, while establishing the identity of Zeus with

life, and vegetation as the primal form of life, they also throw the fierce light of truth on the real nature of the myths, on the purpose for which they were digested, and on the scientific attainments of those who composed and wrote them.

Hesiod's own description of Zeus runs thus :

- ἀλλ' ὅτε δὴ Δῖ' ἔμελλε θεῶν πατέρ' ἠδὲ καὶ ἀνδρῶν
 τέξεσθαι, τότε ἔπειτα φίλους λιτάνευε τοκῆς
 τοὺς αὐτῆς Γαίαν τε καὶ Οὐρανὸν ἀστερόεντα,
 μῆτιν συμφράσσασθαι, ὅπως λελάθοιτο τεκοῦσα
 5 παῖδα φίλον, τίσαιτο δ' ἐρινῶς πατρὸς ἐοῖο
 παίδων θ' οὐς κατέπινε μέγας Κρόνος ἀγκυλομήτης.
 οἱ δὲ θυγατρὶ φίμῃ μάλα μὲν κλύον ἦδ' ἐπίβοτον,
 καὶ οἱ πεφραδέτην ὅσαπερ πέπρωτο γενέσθαι
 ἀμφὶ Κρόνῳ βασιλῆϊ καὶ νιέϊ καρτεροθύμῳ.
 10 πέμψαν δ' ἐς Λύκτον, Κρήτης ἐς πῖονα δῆμον,
 ὁππότε ἄρ' ὁπλότατον παίδων ἤμελλε τεκέσθαι,
 Ζῆνα μέγαν· τὸν μὲν οἱ ἐδέξατο Γαῖα πελώρη
 Κρήτη ἐν εὐρείῃ τραφόμεν ἀτιταλλέμεναί τε.
 ἔνθα μιν ἔκτο φέρουσα θαῖν διὰ νύκτα μέλαιναν
 15 πρῶτην ἐς Δίκτην· κρύψεν δέ ἑ χερσὶ λαβοῦσα
 ἄντρῳ ἐν ἡλιβάτῳ, ζαθέης ὑπὸ κεύθεσι γαίης,
 Αἰγαίῳ ἐν ὄρει, πεπυκασμένῳ, ὑλήεντι.
 τῷ δὲ σπαργανίσασα μέγαν λίθον ἐγγυάλιξεν
 Οὐρανίδῃ μέγ' ἄνακτι, θεῶν προτέρῳ βασιλῆϊ.
 20 τὸν τότε ἔλῳν χεῖρεσσιν ἐὴν ἐσκάθετο νηδύν,
 σχέτλιος, οὐδ' ἐνόησε μετὰ φρεσὶν, ὥς οἱ ὀπίσσω
 ἀντὶ λίθου ἐὸς υἱὸς ἀνίκητος καὶ ἀκηδῆς
 λείπεθ', ὃ μιν τάχ' ἔμελλε, βίῃ καὶ χερσὶ δαμάσσας,
 τιμῆς ἐξελάαν, ὃ δ' ἐν ἀθανάτοισιν ἀνάξει.
 25 Καρπαλίμως δ' ἄρ' ἔπειτα μένος καὶ φαίδιμα γυῖα
 ἠῤῥετο τοῖο ἄνακτος· ἐπιπλομένων δ' ἐνιαυτῶν
 Γαίης ἐννεσίῃσι πολυφραδέεσσι δολωθεῖς
 ὃν γόνον ἄψ' ἀνέηκε μέγας Κρόνος ἀγκυλομήτης,
 νικηθεὶς τέχνῃσι βίῃφί τε παιδὸς ἐοῖο.
 30 πρῶτον δ' ἐξήμεσσε λίθον, πύματον καταπίνων·
 τὸν μὲν Ζεὺς στήριξε κατὰ χθονὸς εὐρυδοείης
 Πυθοῖ ἐν ἡγαθῇ γυάλοισι ὑπο Παρνησοῖο
 σῆμ' ἔμεν ἐξοπίσω, θαῦμα θνητοῖσι βροτοῖσι.
 Λῦσε δὲ πατροκασιγνήτους ὀλοῶν ἀπὸ δεσμῶν
 35 Οὐρανίδας, οὓς δῆσε πατὴρ ἀσειφροσύνησιν·
 οἱ οἱ ἀπεμνήσαντο χάριν εὐεργεσιάνων,
 δῶκαν δὲ βροντὴν ἠδ' αἰθαλόεντα κεραυνὸν
 καὶ στεροπὴν· τὸ πρὶν δὲ πελώρη Γαῖα κεκεῖθαι·
 τοῖς πίσυνος θνητοῖσι καὶ ἀθανάτοισιν ἀνάσσει.—Theog. 468.

But when upon the point of bearing Zeus,
 The sire of gods and men, then did she pray
 Her parents dear, both earth and starry sky,
 That nought material be devised, whereby
 She might unknown bring forth her cherished son,
 And satisfy the wrongs done to her sire,
 And to those children of her own as well
 Whom the great crafty Kronos had devoured.
 Their daughter dear, exceeding dear, they heard,
 Were influenced, and planned right well for her
 Whate'er by fate's decree was held in store
 For royal Kronos and his high-souled son.
 So to the light, distinction's rich domain,
 They sent her on the point of bringing forth
 Her youngest, greatest child, the mighty Zeus.
 Revolving earth first took him to herself
 To rear in broad distinction and to nerve;
 Whilst bearing him through darkness passing black,
 To the first indicant she came, and neath
 The nooks of righteous earth hid what she grasped
 Inside a sapless cell, within a mass
 That woody, compact, and expansive was.

But in the palms of the great high-born king,
 The former ruler of the gods, she placed
 A mighty stone concealed in swaddling garb:
 This grasping then he swallowed in his maw,
 The reckless one! nor minded well in thought
 How, in the ages yet to come for him,
 There would be left, as price of this same stone,
 His son unconquered, calm, transcending all
 In force and skill, whose destiny 'twould be
 To quickly chase him from his high estate
 And 'mongst immortals reign himself supreme.

Rapid, moreover, waxed this ruler's strength
 And limbs distinct; and as the years rolled by,
 Great crafty Kronos spewed his offspring back,
 By matter's fine suggestive ways deceived,
 O'ercome by arts and vigour of his son.
 The stone, that last he gulped, he first disgorged;
 And that same stone was rendered fast by Zeus
 Down in the fissured earth at Pytho fair
 Under the hollows of Parnassus mount,
 To be a token for all time to come,
 A wondrous work to perishable flesh.

From galling ties he also freed his kin,
 The high-born whom his sire had fatuous bound;

Thanks for his benefits they felt, and gave
 Thunder and lightning and the flaming bolt ;
 (These the revolving earth had previous hid) ;
 Trusting to these he rules both gods and men.

NOTES.

- 4 *μητιν*.—She begged for the existence of that which would be (*μητιν*) *not matter*, that is, life.

“A breath thou art,
 Servile to all the skyey influences
 That doth this habitation, where thou keep’st,
 Hourly afflict.”—*Shakspeare*.

- 5 *παρὸς εἶοιο*.—Were there no life on earth, there would be no soul ; so that through life alone could the separation of heaven from earth be avenged.

“There is, they say, (and I believe there is,)
 A spark within us of th’ immortal fire,
 That animates and moulds the grosser frame ;
 And when the body sinks, escapes to heaven,
 Its native seat, and mixes with the gods.”—*Armstrong*.

- 7 *ἐπίθοντο*.—All the bodies in our universe influence and are influenced by one another through gravitation.

- 10 *Λύκτον*.—*λευκός*, “light, clear, brilliant.” Life came from on high.

“In him was life ; and the life was the light of men.”

John i. 4.

“Between two worlds life hovers like a star,

’Twixt night and morn, upon the horizon’s verge.”—*Byron*.

Κρήτης.—*κρίνω*, *κριτέον*, “to distinguish, separate, test.” The outer verge of earth would be the “distinguishing ground” for all that would be evolved, the *criterion* as it were of their characteristics and distinctive marks.

- 14 *νύκτα μέλαιναν*.—As it was “the Golden Age” when earth was like unto our sun in all respects, this “darkness passing black” has reference to the opaque, relatively cool and compressed mass of vapour lying *between* the body of the sun and the outer luminous corona, and to which, as some say, the appearance of the sun spots is attributable. If life received its being on the verge, it would have to pass through this dark or non-luminous zone in order to reach earth proper.

- 15-17 The derivation *δείκνυμι*, *δεικτέος*, “to indicate, point out,” marks *Δίκητην* as being identical with the *Δακτυλοὶ* of later mythology, that is, with C, O, and H, as already noticed ; so that *πρώτην Δίκητην* is consequently “the first or most important dactyl, the pointer, the indicating element,” that is, carbon.

- 16 *ἡλιβάτωρ*.—Ionic form of *ἀλιβάτωρ*, which like *ἀλίβας* (from a *λιβάς*) denotes “sapless, lifeless.”

The entire paragraph has reference to cell growth. Earth,

says the poet, endowed with the principle of life came to the characteristic indicator of life, the carbon, and enclosed the precious gift in a cell (*ἀντροφ*) devoid of sap and surrounded by a mass (*ἐν ὄρει*)—starch and gluten—that was compact in texture (*πεπυκασμένῳ*), vegetable in nature (*ὑλήεντι*), and possessed of expansive or germinating powers (*Αἰγαίῳ, αἰεὶ γαίῳ*, “ever exulting, ever springing”).

“Every plant,” writes Youman, “springs from a seed, and every perfect seed contains the rudiment of a new plant, called the *germ* or *embryo*. . . . The minute plant lies imbedded within the seed, surrounded by a protecting mass, which consists chiefly of starch and gluten. . . . Wrapped in this envelope, the embryo remains at the disposal of external agents. In certain conditions it continues at rest and torpid; but when these conditions are changed, it suddenly awakens from its slumber, puts forth a new power and begins to grow; this is called *germination*.”

- 18-24 Our rocks are formed from the ruins of their predecessors; they are new personages, so to speak, dressed up in garments that have been made over again from the raiment worn by those who lived immediately before them. These coverings consist of compound matter which becomes less composite in a sense according as we go down the scale of geological formations. The fundamental granite is no exception. Its constituents are quartz, mica, and feldspar, all three of which are extremely simple in composition, being either pure silica (Si O_2) as in the case of quartz, or silicates of alumina with a small proportion of potash, soda, iron, lime, and magnesia, as in the case of mica and feldspar. These it received, as we must believe, from the primal crust; and if they be simple in the granite, how much simpler must they have been in its predecessor? Simple enough, certainly, to warrant their being called *σπάργανα*, “swaddling clothes; anything reminding us of our birth, our family, and our childhood.” But though these swaddling clothes, however altered, have been handed down by the first crust to the granite, and by it to the fossiliferous pile above, the primeval crust itself nowhere appears: it was swallowed by time in the fiery ocean underneath.

It was this primal crust, then, swathed in elementary coverings, that Rhea gave to Kronos, and it was this he swallowed, not knowing, as Hesiod says, that the price of this mighty stone would be the granite and fossiliferous rocks where life would flourish and have sway.

- 27 *ἐννεσίῃσι*.—Matter was busily employed in *insinuating* one element into another, so as to form compounds and establish solidity. Life, too, was increasing in vitality, and multiplying its visible forms.
- 30 *πρῶτον λίθον*.—The stone that time had swallowed, it now dis-

gorged. It went down as the primeval crust, but it came up as *granite*, which, as mentioned in the text, has a deep-seated origin in the earth, forms the nucleus, or hollows, of our mountain chains, has subsisted for all time, and owing to its hardness and durability contrasts wonderfully with mortal flesh that perishes all too quickly.

Such is the mythological narrative of the introduction of life upon our globe. It is wonderful, fascinating, daring in the extreme. It takes us beyond the metamorphic rocks where geology stops, beyond the granite to which the same geology looks conjecturally, beyond even that crust from which, though unrecognised, our granite is supposed to have got its own constituents by disintegration. Beyond all these does it take us, to a period in earth's history when our globe was a dying out sun, hot enough to prevent the elements from permanently combining, hot enough to permit but a molecular existence. Here and under such conditions, with no soil wherein to plant its radicle, no rain from which it could derive sap, no atmosphere proper whence it could draw carbonic acid, does mythology place the beginning of Life ! Both the time and the conditions are bewildering.

But life itself is equally bewildering. "However viewed," writes Youman, "the transcendent miracle of nature is LIFE. Whether considered as supporting the spiritual fabric of mind above, or as rooted in the inorganic world below, it is alike wonderful. Springing from ethereal airs and yet invincible ; constantly perishing, and yet abounding in earth, air, and sea ; forever conquered by death, yet evermore triumphant—'strongest and weakest of the things God has made,' it is not surprising that it has been regarded as unlike all else in nature."

To deny the capabilities of this life, no matter what the conditions may be, would be injudicious ; to argue on its possibility when our earth was half star half planet is admissible, since the astronomical mind is strongly impressed with the idea of life in Mars, Venus, and the other planets, and is not inclined to deny it absolutely even in the Sun. "Some hold it not improbable that the

sun may be inhabited. The gaseous stratum, which is the source of light and heat, appears to be at a great elevation above the solid nucleus; and the non-luminous stratum or atmosphere that intervenes may be of a nature to temper the rays, and render their intensity consistent with organic life." What holds good for the sun to-day holds equally good for earth in its sun days.

It may be remarked too that whatever knowledge science possesses as regards the structure and origin of our precious stones points to a far distant period beyond the metamorphic rocks, and admits also the strong probability of plant life having been a factor in initiating the change from carbon to diamond.

Much evidently depends on the nature of the first vegetation; and with respect to this, mythology and science alike declare that it consisted of algæ and fungi, thallogens both, and the lowest varieties of plant life with which we are acquainted. The simpler of the two would seem to be the fungi which have the mushroom for apex, and thence go down the scale to the microscopic mould, mildew, smut, rust, and hundred others which we have no name for, and know so little of. "We are entirely ignorant," says Lindley, "of the manner in which the stems of those that are arborescent are developed, and of the course taken by their ascending and descending sap—if indeed in them there really exist currents similar to those of flowering-plants; which may be doubted. We know not in what way the fertilising principle is communicated to the sporules or reproductive grains; the use of the different kinds of reproductive matter found in most tribes is entirely concealed from us. It is even suspected that some of the simplest forms—of algæ and fungi, at least—are the creatures of spontaneous growth: and, in fine, we seem to have discovered little that is positive about the vital functions of those plants, except that they are reproduced by their sporules, which differ from seeds, in germinating from any part of their surface, instead of from two invariable points."

Could these exist under the conditions which our igneous globe presented? Nothing forbids the idea. Plant life of this most simple kind must be next in endurance to the spores themselves which we must suppose as existing from created matter and subjected to even still greater heat. Nor would some favourable circumstances be entirely absent. The meridian of the "Golden Age" would have passed and earth have felt the cooling effects of outer space. The rain, trickling from the summits where it originated, would constantly and increasingly keep vaporous the steamy atmosphere which enveloped the nucleus of our globe. Oxidation, the first step towards crust-making, would quickly occur for elementary matter, but the same oxidation that brought combination would also bring decay. A decayed particle or two of inorganic material would be a fertile kingdom for a microscopic spore; heat and moisture, when combined, would be its proper sustenance; and, once developed, it mattered little how long it would survive, for in its case, decay meant victory and strength, plenitude and renewal,—all four the children of primeval Styx.

To microscopic algæ and fungi that thrive alike in earth, air, or water, and seem to be independent of soil and light, of colouring matter and of sex, that can defy an abnormal degree of heat, if moisture be but present, that can grow, like our puff-ball, "in a single night from a mere point to the size of a large gourd, forming on an average not fewer than 20,000 new cells per minute,"—to such simple life-forms, the bafflers of more complex ones on the battleground of generation, there are evidently no set bounds as to time, conditions, capability, or endurance.

BOOK SEVENTH.

TITANIC TIES—(*continued*).

CHAPTER I.

THEOGONY.

IAPETUS and CLYMENE	{	Atlas
		Mencetius
		Prometheus
		Epimetheus

MYTHS.

Iapetus.—A Titan, married to Clymene, according to Hesiod; to Asia, according to Apollodorus. He was the father of Atlas, Mencetius, Prometheus, and Epimetheus; and was looked on by the Greeks as the ancestor of the human race.

Clymene.—Daughter of Oceanus, and wife of Iapetus.

Atlas.—A son of Iapetus, and condemned by Zeus to bear the heavens on his head and shoulders. Later traditions assert that he was metamorphosed into a mountain, on which rested heaven with all its stars. At first the story of Atlas referred to only one mountain which was believed to exist on the extreme boundary of the earth; but the name was gradually given to other mountains, so that we are told of a Mauretanian Atlas, an Italian, Arcadian, Caucasian, &c.

Mencetius.—A brother of Atlas. He was killed by Zeus with lightning, and hurled to Tartarus.

Prometheus.—The most famous of all the children of Iapetus. The Hesiodic legend, as generally rendered with regard to him, runs thus: Once, when gods and men were in dispute at Mekone, Prometheus cut up a mighty ox, and divided it into parts for the purpose of alluring Zeus. The first heap contained the flesh, intestines, fat, and skin; the second heap consisted of bones covered with shining fat. When Zeus commented on the shares, Prometheus told him that he could

make his choice. Zeus, though cognisant of what he did, chose the bones covered with fat. The father of the gods avenged himself by withholding fire from mortals, but Prometheus stole it in a hollow receptacle or *vápθnξ*. Thereupon Zeus chained Prometheus to a rock where his liver, consumed by an eagle in the daytime, was again restored each night. This torture he endured for many centuries. Finally, however, when Hercules in pursuance of his Eleventh Labour went in quest of the Golden Apples of the Hesperides, he killed the eagle and delivered Prometheus, Zeus not being unwilling.

Various additions have been given to the story by later writers. We are told, for instance, that Prometheus helped Zeus in his war against the Titans; that he it was who split the head of Zeus and thus enabled the god to give birth to Minerva; that he entertained an ardent affection for this goddess, and was assisted by her when he secretly stole fire from heaven, and gave it, concealed in a *vápθnξ*, to those mortals whom he had fashioned from earth and water; and that for doing so without the cognisance and will of Zeus, he was chained to a rock, hurled with this rock to Tartarus, again brought back to the upper world, and fastened to Mount Caucasus, where his liver was devoured by an eagle, as already mentioned, until Hercules delivered him.

He is represented as the friend of mankind, and their teacher in architecture, astronomy, mathematics, and many other arts and sciences; and it is further stated that when Zeus proposed to destroy the whole race of mortals, and to fill their place with a new race of beings, Prometheus succeeded in warding off the general destruction.

Epimetheus — When Prometheus committed his famous theft, Zeus caused Vulcan to fashion from earth and water a female whose grace and beauty would prove a snare, and bring misery on the mortal race to whom Prometheus had given fire. The woman who was thus made, and who was called Pandora, or “the all-gifted,” because each of the gods had dowered her with some charm, was brought to Epimetheus, who made her his wife, and who forgot till too late the injunction given him by his brother, Prometheus, namely, never to receive a gift from Olympian Zeus.

CHAPTER II.

IAPETUS, THE TIE OF APTITUDE.

Iapetus.—Design and change are stamped unmistakably on the heavens and the earth and the things of earth. The astronomer bears witness to the fact, and thereby builds a filmy nebula into a fused ball of fire.

The geologist takes up the cry and constructs this igneous ball into a well-clad earth; he points to the separate formations and marks their order in succession and in time; he directs attention to the fossils in these formations, and notes the gradual change from algæ to olive, from mollusk to man. The scientist, too, each in his own way, proclaims that the atmosphere has its laws whereby light, heat, sound, and meteorological phenomena are regulated; that the ocean is disciplined as to tides and currents; that earth as a whole is so strictly governed as to ever make the day succeed the night, and the seasons to pursue their unvarying round; and that the things of earth, rocks with their constituents, crystals with their angles, plants with their cellular and vascular tissues, and animals with their complex parts, are all subject to law, order, and definite arrangement. The universe and its parts, the mass and the molecule, the inanimate and the animate have been fashioned after a Plan or Scheme, the beginning, end, and reason of which we know not, but the course, order, and law of which we can trace distinctly in all that we see around us.

The Plan must be either a provisional one, or else there must be some impulse in matter and force whereby they adapt themselves to the Plan. As the former hypothesis is contrary to our notions of an omnipotent and immutable Deity, we must embrace the latter and suppose that there

is an eternal fitness of things, an adaptation of themselves towards the end for which they were determined. How far back can we push it? Possibly, to matter itself; but as we do not recognise matter except through its phenomena, a safe point to go back to is that where matter, in changing from the unknown to the known, became visible. This visibility appeared with the coming into being of molecular matter, that is, with the Titans, of whom Iapetus was one; and it is this *Iapetus* (ἰππομαι, "to fit," the *i* being euphonic as in *laúō* for *aúō*) that personifies the *aptitude* or fitness of things towards the destined end.

As this adaptation necessarily implies both mind and spirit, the former to prompt, the latter to act, then both of these must have been present in the condition of our globe when Iapetus flourished,—when earth, a sun satisfied for the time being with its gaseous nature and magnified to the utmost by swelling incandescence, had nevertheless a prompting towards planetary existence and the capability of adapting itself wholly and partly to this end,—its shape and surface for the spheroid and the crust which cooling would bring about, its constituents, (especially its organic ones as being possessed of greater receptivity or capacity), for the structures that were to be vitalised.

It is with this idea of general adaptation that we must receive the "anima mundi" of ancient philosophy: and with this same idea we should read Virgil's lines, for that which applies to our earth as it once was is equally applicable to every stellar body in the universe:

Principio, coelum, ac terras, camposque liquentes,
 Lucentemque globum Lunæ, Titaniaque astra,
 Spiritus intus alit; totamque, infusa per artus,
 Mens agitat molem, et magno se corpore miscet.
 Inde hominum pecudumque genus, vitæque volantum,
 Et quæ marmoreo fert monstra sub æquore pontus.
 Igneus est ollis vigor, et cœlestis origo,
 Seminibus; quantum non noxia corpora tardant,
 Terrenique hebetant artus, moribundaque membra.

Æn. VI. 724.

From time's first onset, heaven, and earth, and sea,
 The moon's resplendent orb, the gaseous stars,

Are by the spirit in them magnified ;
 And, all infused throughout the several parts,
 The mind excites the structure as a whole,
 And with capacious matter joins it:elf.
 Thence comes the race of mankind and of beasts,
 Thence too of flying kind the living forms,
 And monstrous creatures whom the ocean bears
 Beneath its burnished surface. For such germs
 There is a fiery strength, a birth divine,
 Such that defective bodies do not slow,
 And earthy joints and mortal limbs not dull.

That our earth-sun did look forward to the planetary stage, and did follow out the bent of its impulse, is evidenced by its solidity of to-day. But it had to sacrifice something to adapt itself to the changed condition, and as incandescence was a prime obstacle to solidity, this same incandescence—the Iapetus for the time being—had to go, and to go where approved mythology and science have placed it, in the centre of our globe.

The masterful Life that, with countless million subjects in the ocean and the air, can disregard, if need be, the animated forms on dry land, thus sternly addresses the personification of terra firma:

σέθεν δ' ἐγὼ οὐκ ἀλεγίζω
 χωομένης, οὐδ' εἴ κε τὰ νείατα πείραθ' ἵκηαι
 γαίης καὶ πόντοιο, ἔν' Ἰαπετός τε Κρόνος τε
 ἦμενοι, οὐτ' αὐγῆς ὑπερίονος Ἡελίοιο
 τέρποντ', οὐτ' ἀνέμοισι, βαθὺς δέ τε Τάρταρος ἀμφίς·

Iliad, VIII. 477.

And as for thee possessed with raging hate,
 I heed thee not, not even should'st thou go
 To earth's and ocean's deepest ends, to where
 Iapetus and Kronos all-afame
 Enjoy nor beams of heaven's sun, nor winds,
 And hell's extent abysmal round them lies.

CHAPTER III.

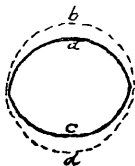
"TOO HIGH-BORN TO BE PROPERTY'D."

*Mencæti*us.—Incandescence, though the greatest, was not the only loss which our globe had to endure in order to fit itself for enrolment among planets. Shape too had to be sacrificed.

When, to go back in point of time, Earth had adapted itself through Iapetus to solar conditions, it brought into being four distinguished entities, namely, rotation, sphericity, light, and visibility.

This, as explained later on, is the same as saying that Iapetus begot Atlas, *Mencæti*us, Prometheus, and Epimætheus. While such is the order in which they are mentioned by Hesiod, Apollodorus enumerates them as rotation, light, visibility, and sphericity, since he names *Mencæti*us last; and each reader can decide for himself which of the two mythographers was the more correct.

One of these, sphericity or *Mencæti*us, was doomed to die an early death in the change from solar to planetary existence. Why and how are best explained by the cut



where the dotted spherical line represents earth as a sun, and the inner line as the planet which it aimed to be. The sphere is evidently too rounded in outline, too glorious (*ὑπερκύδαντα*) as Hesiod says, for a spheroid; too overbearing (*ὑβριστήν*) by *ab* and *cd* for an oblate spheroid; too diffusive (*ἀτασθαλὴς*) and gaseous or high-spirited (*ἡγορέης*)

ὑπερόπλου) in nature for well-defined circumference and incrustation. Now, that which gives its sphericity to the outer figure is evidently the difference between the two

figures, and it is this difference, *the remnant* of the sphere, that is personified by *Mencætiús* (μενετέον, "that which remains, the remnant"). When earth, accordingly, deemed it prudent to embrace the planetary state, it did so by simply sacrificing this remnant. Science expresses this by saying that as a result of continued cooling and rotation earth would shrink from the dimensions and shape of a gaseous sphere to those of an oblate spheroid: mythology tells the same story in its own language when it says that Zeus, the life that came with cooling, stamped down *Mencætiús* into Erebus.

Hesiod tells the story thus:

- Κούρην δ' Ἰαπετὸς καλλίσφυρον Ὠκεανίνην
ἤγάγετο Κλυμένην καὶ ὄμον λέχος εἰσανέβαινε·
ἢ δέ οἱ Ἄτλαντα κρατερόφρονα γείνατο παῖδα·
τίκτε δ' ὑπερκύδαντα Μενόϊτιον ἠδὲ Προμηθεά
5 ποικίλον, αἰολόμητιν, ἀμαρτινόον τ' Ἐπιμηθεύ,
ὃς κακὸν ἐξ ἀρχῆς γένετ' ἀνδράσιν ἀλφειστῆσι·
πρῶτος γάρ ῥα Διὸς πλαστήν ὑπέδεκτο γυναικα
παρθένον. ὕβριστήν δὲ Μενόϊτιον εὐρύοπα Ζεὺς
εἰς Ἑρεβος κατέπεμψε βαλὼν ψολόεντι κεραυνῷ
10 εἶνεκ' ἀτασθαλῆς τε καὶ ἡγορέης ὑπερόπλου.—Theog. 507.

Clymene, vapour's child, and rounded well,
Iapetus selected for his spouse,
And led her to the couch he shared himself.
She bore him Atlas, even-tempered youth;
Mencætiús too, o'er glorious in his ways;
Prometheus, changeful, quick-devising soul;
And erring Epimætheus, who from yore
An evil proved to pleasure-loving men,
For he it was who first did hearken to
His spouse, the maiden fashioned him by Jove.
But Zeus, the Zeus who searches far and wide,
Inclined in thought to smoky, thund'rous bursts,
Struck down the one that held his head too high,
Mencætiús, into lower, troublous depths,
Since too diffuse and spirited he was.

NOTES.

- 2 Κλυμένην.—Clymene, as a child of Oceanus, has reference to aqueous vapour in its characteristic of (κλύω μένος) "all-pervading force; force heard of," though not seen. Our globe, as the adaptive Titan first received it, previous to incandescence,

was nebulous or vaporous in consistency, and shaping itself into a circular form (*καλλίσφυρον*).

- 9 *ψολλόεντι κεραυνῷ*.—The poet implies that the philosophers of his own and of preceding times, the *εὐρύοπα Ζεὺς* or life that inquires into all things, had thrown out the suggestion (*βαλὼν*, “to throw, to ponder”) that flattening at the poles was due to volcanic action. The same opinion was entertained by Apollodorus, who flourished B.C. 140, for he says that Menœtius was destroyed in the war of Zeus against the Titans, a period when volcanic energy was in full play. The modern opinion is that polar flattening is due to rotation of the earth while it was still in a soft or plastic state.

CHAPTER IV.

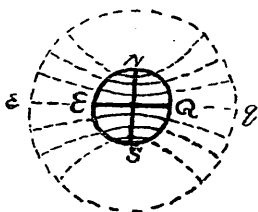
THE WORLD'S WHEEL.

Atlas.—The earth turns on its axis once in twenty-four hours. As this axis passes through the centre from pole to pole and is itself immovable, the points of rotation are evidently in circular planes parallel to the equatorial one which passes from east to west, through the centre of the earth.

For earth as a revolving sphere, then, this equatorial plane is the one great essential, since its revolution involves that of all the others. It is this plane that is personified by Atlas.

Let us examine it in detail, as in the cut, where the outer circle represents the concave surface of the heavens, the inner one our earth, E Q the plane of the earth's equator, and N S the axis.

1. The weight of each hemisphere rests upon it.
2. It runs through the centre of the earth.



3. It faces the north and south poles.
4. It is set upright, or perpendicular to the axis.
5. Its extension in all directions to meet the concave celestial arch forms what is called the Celestial Equator (e q), which divides the heavens into the northern and southern hemispheres.

Let us now read Hesiod's description of Atlas, and we shall find ourselves going over the same details :

"Ατλας δ' οὐρανὸν εὐρὺν ἔχει κρατερῆς ὑπ' ἀνάγκης,
 πείρασιν ἐν γαίῃς, πρόπαρ Ἑσπερίδων λιγυφώνων,
 ἑστηώς, κεφαλῇ τε καὶ ἀκαμάτῃσι χέρεσσι.
 ταύτην γάρ οἱ μοῖραν ἐδάσσατο μητίετα Ζεὺς.—Theog. 517.

But under pressure that's immensely great,
 Placed in the very roots of mother earth,
 Facing the unexplored and lofty poles,
 And upright set, does Atlas with his head
 And tireless hands hold up the heavens wide.
 For such his lot sagacious Zeus assigned.

NOTES.

- 1 "Ατλας.—From bearing the pressure of each hemisphere does he derive his name (τλάω, "to bear, suffer").
- 2 Ἑσπ. λιγ.—This phrase has already occurred in connection with the Gorgons, where it denoted the elevated and unexplored regions surrounding the poles.
- 3 ἀκαμάτῃσι.—The head is at the poles and immovable; the hands are the planes of the equator and parallels of latitude, all of which are *tireless* in their motion round the axis.
- 4 μητίετα Ζεὺς.—That is, the deliberations of science. The εὐρύσπα Ζεὺς represents philosophical research; the μητίετα Ζεὺς stands for the well-digested knowledge which springs from such research.

It is thus that the Farnese Atlas is represented, with head at the pole, shoulders at right angles to the axis, arms embracing the periphery as if they were meridians, and hands resting on the equator.

The classical epithets and phrases are numerous and varied, but always suggestive. *Cœlifer* and *astrifer* have peculiar reference to the plane; *sublimis* and *pruinosis* to the poles; *arduus* and *altus* to the sloping space between the two. The purely terrestrial is visible in "caput inter nubila;" the celestial in "astrorum pondere pressus;" and his functions are marked in "humeris cœlum qui sustinet," "qui cœlum vertice fulcit," "et fessos excipit axes Atlas," "ubi stellifer Atlas axem humero torquet," and many others. Each poet alludes to him after a fashion of his own, and the following are interesting instances.

Homer recalls how the distribution of land and water has never been the same during all the great geologic ages which have elapsed since an ocean laved the globe ; how the forbears of our continents and islands have time and again been covered by a sea, the depths of which, varying as they did at different periods, were plumbed by the shoulders and the hands of this great equatorial plane, and by it alone :

θεὰ δ' ἐν δώματι ναίει
 "Ατλαντος θυγάτηρ ὀλοόφρονος, ὅσπερ θαλάσσης
 Πάσης βένθεα οἶδεν, ἔχει δὲ τε κίονας αὐτὸς
 Μακρὰς, αἱ γαίαν τε καὶ οὐρανὸν ἀμφὶς ἔχουσι.—Odys. I. 52.

Ovid regards Atlas from another point of view, namely, as the plane of the rational horizon ; and as this embraces all other horizons so far as the fixed stars are concerned, he calls it at one time the northern horizon (" gelido sub Atlante "), at another time the western (" Hesperio, regnis Atlantis, in orbe "), and still at other times, as here, the horizon in general :

Juvat ire per alta.
 Astra : juvat, terris et inertī sede relictis,
 Nube vehi, validique humeris insistere Atlantis.
 Met. XV. 147.

Virgil lauds the axis in epitrochio for its services to astronomy. To what are we indebted for our knowledge of the moon's phases, if not to revolution round an axis ? To what is due the vicissitudes of our seasons, those labours of the sun whereby earth is fitted for men and animals, whereby the spring-time with its rain, and the summer with its heat, appear in turn ? To what is the mapping of the heavens due but to the head of Atlas, that Pole-star which guides us to the " pointers " and " guardians " of the twin Dippers ; from these to others, to the circumpolar Arcturus of Bootes, the equinoctial Hyades of Taurus, and so on ? And what again but revolution is it that makes our winter days so short, and nights so long ?

All these were once chanted at the festive board of Dido by the κρήνιος Ἰώπας, the *inquiring seer* who gazed upon the stars and had the world's wheel and axle for a teacher :

Cithara crinitus Iopas
 Personat aurata, docuit quæ maximus Atlas.
 Hic canit errantem Lunam, Solisque labores :
 Unde hominum genus, et pecudes ; unde imber, et ignes :
 Arcturum, pluviasque Hyadas, geminosque Triones :
 Quid tantum Oceano properant se tingere soles
 Hyberni, vel quæ tardis mora noctibus obstet.—Æn. I. 740.

Coming now to the later myth concerning Atlas, we have but to look at the cut in order to see how each hemisphere, sloping regularly from the equator to the pole, with a base of 25,000 miles in circumference and an altitude of 4,000 miles, is a vast mountain as to shape ; and that this mountain has been transformed—from the fused ball of fire which it once was, to the solid mass it is at present. The change is thus described by Ovid, who was evidently a believer in the theory that incrustation was a gradual process which commenced at the polar regions, and extended from there to the torrid zone :—

Et alter

Viperei referens spoliū memorabile monstri
 Aera carpebat tenerum stridentibus alis.
 Cumque super Libycas victor penderet arenas,
 Gorgonei capitis guttæ cecidère cruentæ,
 5 Quas humus exceptas varios animavit in angues :
 Undè frequens illa est, infestaque, terra colubris.
 Indè per immensum ventis discordibus actus
 Nunc hùc, nunc illuc, exemplo nubis aquosæ
 Fertur, et ex alto seductas æthere longe
 10 Despectat terras, totumque supervolat orbem.
 Ter gelidas Arctos, ter Cancrī brachia vidit :
 Sæpè sub occasus, sæpè est ablatus in ortus.
 Jamque cadente die veritus se credere nocti,
 Constitit Hesperio, regnis Atlantis, in orbe :
 15 Exiguamque petit requiem, dùm Lucifer ignes
 Evocet Auroræ, currus Aurora diurnos.
 Hic hominum cunctos ingenti corpore præstans
 Iapetionides Atlas fuit. Ultima tellus
 Rege sub hóc, et pontus erat, qui Solis anhelis
 20 Æquora subdit equis et fessos excipit axes.
 Mille greges illi totidemque armenta per herbas
 Errabant : et humum vicinia nulla premebant.
 Arboreæ frondes auro radiante nitentes
 Ex auro ramos, ex auro poma tegebant.

'Hospes,' ait Perseus illi, 'seu gloria tangit
Te generis magni, generis mihi Jupiter auctor :
Sive es mirator rerum, mirabere nostras.
Hospitium requiemque peto.' Memor ille vetustæ
Sortis erat : Themis hanc dederat Parnassia sortem :
'Tempus, Atla, veniet, tua quo spoliabitur auro
Arbor, et hunc prædæ titulum Jove natus habebit.'
Id metuens solidis pomaria clauserat Atlas
Mœnibus et vasto dederat servanda draconi,
Arcebatque suis externos finibus omnes.

- 35 Huic quoque, 'Vade procùl, ne longè gloria rerum
Quam mentiris,' ait, 'longè tibi Jupiter absit,'
Vimque minis addit, manibusque expellere tentat
Cunctantem et placidis miscentem fortia dictis.
Viribus inferior (quis enim par esset Atlanti
Viribus?) 'At quoniam parvi tibi gratia nostra est,
Accipe munus,' ait; lævâque à parte Medusæ,
Ipse retrò versus squalentia prodidit ora.
Quantus erat, mons factus Atlas: nam barba comæque
In sylvas abeunt, juga sunt humerique manusque :
45 Quod caput antè fuit, summo est in monte cacumen :
Ossa lapis fiunt. Tùm partes auctus in omnes
Crevit in immensum (sic Dî statuistis) et omne
Cum tot sideribus cœlum requievit in illo.—Met. IV. 614.

With strident wings the other cleaved thin air,
The snaky monster's memorable spoil
Transporting. And when over Afric's courts
The victor hung, from Gorgon's head there fell
Those gory drops that earth, when captured, warmed
For spotted snakes; for reason which that clime
With serpents favoured and infested is.
Thence through wide space, by varying winds impelled,
He's driven, like a rain cloud, here and there;
And high in air looks down upon the lands
Snatched from the top, and speeds all round the globe.
Thrice the cold poles, thrice Cancer's arms he saw :
Oft to the west, oft to the east was borne.
And now, the day declining, loth to trust
Himself to night, he stayed his course awhile
In realms of Atlas on the western bounds,
And craves short rest: till Lucifer may call
Aurora's lights—the daily courses, she.
And here, all men forestalling, huge of bulk,
Was Atlas, of Iapetus the son.
Beneath this king was circumpolar land,
Beneath him too was circumpolar sea,—
This king who forges for Sol's panting steeds

Wide realms of space, and the fixed axes holds.
 All at a loss for herbage roamed his herds
 And thousand flocks,—their like ne'er pressed the soil.
 The branching fronds, aglow with radiant gold,
 The golden arms, golden circles hid.
 To him speaks Perseus, " Hospitable lord,
 If great ancestral glory weigh with thee,
 The author of my birth is Jove; or if
 Of actions great admirer thou should'st be,
 Ours thou'lt admire. Shelter and rest I crave."
 The other bore in mind the olden lot,
 (This lot Parnassian Themis had assigned),
 " The time will come, O Atlas, when of gold
 Thy tree shall be despoiled, and when Jove's son
 Shall have it as the token of his spoil."
 His orchards Atlas, fearing this, had kept
 Aloof from solid walls, and placed as guard
 A dragon huge of bulk; and he himself
 Repelled all strangers from his confines wide.
 And so to him he cried, " Away! begone!
 Lest Jove, or glorious deeds you brag so of,
 Prove but of small advantage unto thee";
 And force to threats he adds, and with his hands
 Endeavours to expel him lingering
 And interspersing fierce with soothing speech.
 Made answer he, inferior much in strength,
 (For who in strength with Atlas could compare?)
 " Since then of small account our thanks to thee,
 Thy meed receive"; and, backward turned, prolonged
 Medusa's squalid features from the left.
 Atlas, though great, a mountain then was made;
 For beard and locks now into woodlands go:
 The couples are his shoulders and his hands:
 What once was head is now the pole on high:
 His bones to stone are changed: and later on,
 Swelled out in all directions he has grown
 To boundless space, (so ye, O Gods, ordained,)
 And on him laid is heaven with all its stars.

NOTES.

- 1-6 The poet goes back in thought to the time when our globe was a fused ball of fire, except at the circumpolar regions (the Gorgon's head), where a crust had been formed by the first cold wave that notably affected earth.
- alter.—This wave, or Perseus, is introduced as carrying, like a tornado, the flaming and fiery particles which it had licked up from the hardened polar surfaces.

- 3 *aera*.—The atmosphere was but a quasi one, being excessively *thin* or attenuated, owing to rarefaction.
- 4 *cedidere*.—The greater heat of the Libyan regions rarefied the air still further, diminished the pressure, and so permitted some of the fiery *débris* to fall.
- 7-14 For century after century (*ter-ter*) did the cold wave range the globe in all directions, viewing as it were with satisfaction the circumpolar parts snatched (*ex alto seductas terras*) from the fiery vortex and congealed. It was only at the close of the long igneous day (*cadente die*) that the intensely heated equatorial regions could be successfully attacked.
- 14 *Hesperio in orbe*.—Geologically speaking, the western hemisphere is the first born among continents.
- 19 *Rege sub hoc*.—The polar regions (*ultima tellus*) already crusted over, and the waters (*et pontus*) that rested on this crust, were (and still are) under the equatorial plane. The same plane extends in imagination (*subdit*) into realms of space far beyond our solar system, to the very confines of the universe.
- 20 *fessos*.—"Tired out, not able to move, *immovable*"—as the axis is.
- 21 *greges—armenta*.—The hills and mountains in embryo, cattle whose like was never seen on earth, and searching vainly for that which did not exist as yet—the grass.
- The *per* is separated from *errabant* by *tnesis*.
- 23-24 Each hemisphere, consisting as it does of a succession of parallel circular planes that narrow in diameter from the equator to the pole, is likened by the poet to a tree. The fiery surface arborescence concealed from view the branching radii (*ramos*) of these circles, and the planes themselves or circular fruit (*poma*) produced by these radii.
- 30 *Themis*.—The law already laid down (*τιθημι*) or established, right, the Latin *fas*; Parnassus (*Παρνασός* or *Παρνησός*, from *πανής* or *πρηνής*) signifies "forward, before." Parnassian Themis is consequently "the law laid down from the beginning."
- 34 *arcebat*.—The dragon of fire inside guarded the tree and fruit; Atlas himself, the glowing surface, kept out the rain, vapour, and such other dangerous strangers.
- 38 *placidis—fortia*.—There was a succession of cold spells, some with stormy winds, others without.
- 40 *par esset viribus*.—Rotation increases from north or south towards the equator. The minimum is at the poles; the maximum is at the equator where the rate is 1000 miles per hour. The most violent hurricane that we know of travels but about 100 miles an hour.
- 41 *læva*.—The word, as already noticed in connection with the Gorgons, is indefinite as to direction.
- 42 *retro versus*.—The current changed from a descending to an ascending, and turned back from the equator, as explained when treating of Bellerophon.

- 43 *mons factus*.—The cold descending current from the poles had time and again essayed to keep near the surface when approaching the equator, but was as often beaten back by the intense heat and forced to abide in the high upper regions (*æthere longe*). But now, when the decline of the Igneous Day afforded more favourable conditions, it renewed the attack, succeeded in landing on the torrid regions of the Western Hemisphere, and this time with better results. The crusty features (*Medusæ squalentia ora*) already established at the poles were prolonged (*prodidit*) to the equator, and an Atlas of fluid fire was transformed to solid stone.
- 44 *juga*.—*jugum* is “a yoke, a pair” of anything. Here, of course, it denotes any pair of quadrants or semi-meridians, that extend like arms from pole to equator, and bound the hemisphere.
- 46 *Tum auctus*.—The equatorial plane, swelled out to meet the concave surface of the heavens, forms the base of the sidereal hemisphere: “such is the teaching of astronomers,” (*sic Di statuistis*) says Ovid, concluding after the fashion of Hesiod.

CHAPTER V.

THE METAPHYSICS OF MYTHOLOGY.

THAT mythology, a description of matter and force, would be oblivious of Mind, the most exalted of forces, is a supposition that cannot be reasonably entertained. It must consequently have some word personifying mental force; and everything, genealogy, derivation, verbal garb, and classical quotations point to Prometheus as that word.

What is this mind of which we are possessed, and whence does it come? Is it material, or immaterial, or a combination? If a combination, how came it to be associated with matter? Is it primordial, or evolved? Is it confined to the human being, or common to all three of nature's kingdoms?

All these queries are more or less connected with the genealogy of Prometheus. As philosophy also is concerned with them, it may be well to outline the doctrines of the various Greek schools, if for no other reason than to point out the real aspect of the mythical symbols from Chaos to Hemera, and the large extent to which metaphysics is indebted to mythology in solving such fundamental inquiries as "What original principle lies at the basis of all matter? What was the primal agent in determining motion? How did abstract being pass over to the concrete? How came mind to be associated with matter?"

ANCIENT PHILOSOPHY.

Thales.—Born about 636 B.C. Water is the origin of all things; "the principle of all things is water; from water everything arises, and into water everything returns." The earth floats upon a sea of this elemental fluid. All things are full of gods. The soul originates motion. There is a soul in the magnet.

Anaximenes.—Flourished about 544 B.C. Air is the primal principle. At a greater or less degree of density, everything becomes boundless air. Movement pervades it, heat expands it, cold contracts it; under these three moving forces, and with various degrees of condensation, the earth, sun, and stars were formed.

Anaximander.—Born about 610 B.C. The beginning or ἀρχή of all things is that which in itself is undetermined and simple (ἄπειρον), embracing all, ruling all, the prime source of all separate existences and individual forms, and also the final end to which such existences and forms should return.

The above-named philosophers are the chief representatives of the Ionic School, and all three are said to have adopted a sensuous substratum for the origin of matter. But this is questionable. Thales, with the Theogony for his guide, might have come to the conclusion that as Oceanus was the first born of molecular matter, this same Oceanus or watery vapour must have had a previous existence in the shape of atomic matter, and would thus through a long series of abstractions constitute the first or oldest principle of being. Anaximenes, reasoning after the same fashion, would be led to the same conclusion as to the primal base, with this exception that what was *watery* vapour to Thales would be the *vapour* of water to him. So that what one called water, and the other air, would in reality signify the self-same thing. In no way does the term “sensuous” apply to Anaximander, whose ἀρχή forcibly recalls the Chaos of mythology, or the simplicity of being, as the Chaos has been shown to represent. The founders of the Ionic School may consequently be considered as the pioneers of abstraction as well as of philosophy; and since all three were contemporaries, the principle of pure being may well be dated from the very earliest of the Greek Schools.

Pythagoras.—Flourished between 540 and 510 B.C. Scarcely were the founders of the Ionic School gathered to their forefathers when Pythagoras and Xenophanes ap-

peared in the philosophical arena. As Pythagoras and his immediate successors committed none of their doctrines to writing, it is through such followers as Philolaus, Eurytas, and Archytas, who flourished a century or so later, and were contemporaries of Socrates and Plato, that we get what information there is regarding the tenets of the school. The general dogma maintained by them, namely, that "number is the essence of things, every thing is number," has excited much inquiry. Did they regard number as the principle itself of things, or only as the archetype? Is everything but a representation of number, or is number merely a representation of every thing? While there is much that is vague and mysterious attached to the history of the founder, his followers, and the philosophy, three leading points are said to stand prominently forth, the religious, the philosophical, and the occult. As pure philosophy would involve no more personal danger to him than to those who preceded him or to the Eleatics who flourished in his day, the great secrecy attached to his teachings, the rigid examination of would-be-disciples and the probationary periods of such, the silence to which they were pledged with regard to all persons outside their own ranks, and the signs and passwords by which they recognised each other,—all these must be ascribed to the religious cult, or to the occult, or to both.

If, now, we suppose (what is very likely) that in his travels through Egypt and the East Pythagoras had acquired a knowledge of the One true God, of the Trinity, and of a Christ to come, we can readily account for the caution and secrecy which play so prominent a part in the inculcation of his doctrines. Many circumstances are in harmony with the supposition. The religious element in his teachings profoundly impressed the philosophers of his own and subsequent times; his immediate followers regarded him in the light not so much of a philosopher as of a prophet whose mission it was to reveal divine truths and to inculcate a mode of life distinguished for abstinence,

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temperance, patience, harmony, and such other virtues as tended to purify and elevate mankind. In proof of this it has been generally conceded that the followers of his school were men noted for their self-restraint, upright lives, and for devoted friendship to each other.

Apart, however, from their religious teachings, they appear to have practised and inculcated some one branch of knowledge not generally known, one which created a kind of brotherhood among the members, necessitated the greatest skill, caution, and secrecy on their part, and had some bearing on their teachings as a whole. What this peculiar knowledge was is not openly stated, but the weight of circumstantial evidence points to chemistry, or the alchemy of old. It was in Samothrace that the cult of the Cabiri was especially active, and this cult the Samothracians had received from the Pelasgians, as Herodotus tells us.

Would such a thinker and inquirer as Pythagoras was remain in ignorance of this chemical knowledge, especially as he was born in Samos, not many leagues from Samothrace? A science like chemistry, so broad in aim, so fertile in research and practical in results, so exclusive to the many and so fascinating to the mind, would instantly draw round its expounder the "Three Hundred" of Crotona, Tarentum, and of other important towns in Italy where up to this chemistry was unknown. As the chemist of those days was looked upon as a magician who juggled with the property and lives of those outside his circle, as a dealer in the "Black Art" to be shunned, suspected, and forcibly removed, there would be an absolute necessity for observing the scrutiny, probation, secrecy, and shibboleths which we read of. "Everything is not to be told to everybody" is a motto originating with them. It is difficult from a perusal of his life to understand Pythagoras in the light of a politician, but it is thoroughly consonant with his characteristics to understand him as devoted to chemistry. "Of all men," said Heraclitus, "Pythagoras, the son of Mnesarchus, was the most assiduous inquirer."

Finally, there is no other branch of knowledge save chemistry that deals so extensively with number, or that identifies matter and number so closely together. To the chemist all things *are* number; what we call hydrogen, oxygen, sulphur, iron, gold, are to him 1, 16, 32, 56, 196; and so on with every other element and with every known combination of elements, solid, fluid, and gaseous.

Taking, then, their science, philosophy, and religious cult together, we arrive at a better meaning of what Aristotle alludes to when he regards the Pythagorean system as something which in its leading features characterised the school generally. Thus while their primary unit would represent the One true God in religion, it would also represent the oneness of abstract being in metaphysics, and the oneness of elementary being in chemistry. This is in harmony with what Aristotle says when he refers to this unity as (1) the principium, (2) the essence, and (3) the element of all things,—the divine unity being the first principle and cause; and one, the first of all numbers and the element of all numbers, being the basis of existence, and when itself become possessed of extension, the element of all that possesses extension. Since the nature of the subject under discussion would decide the character of the units, no confusion would arise; for while 9 would represent the digits to an arithmetical conclave, or the nonagon to a geometrical, it would represent the Muses to a poetical one, the orders of angels to a theological, or some element like Glucinum to a chemical. If not, then we must condemn our own methods, since outside of Infinity there is nothing which we do not divide, subdivide, and still further classify into orders expressly, into numbers tacitly. Animate beings, for instance, may be divided into (1) men, (2) animals, and (3) plants; men are subdivided into (1) Caucasian, (2) Asiatic, (3) African, &c.; and Caucasians are classified as (1) English, (2) French, (3) Germans, &c. In all these instances (1) will be representative respectively of man, Caucasian, or English, according as we are discussing animate being, race, or

nationality; and not only representative but identical so to speak, since often as not we allude to them as the first, the second, the third, &c. Thus what Aristotle said of the Pythagoreans, "they held things for numbers" is in a measure applicable to ourselves.

In their philosophy they also appear to have gone back to the Chaos of Mythology, but instead of regarding this basal being in the line of simplicity, as Anaximander did, they, in conformity with their number method, viewed it as oneness; and instead of using the *ἄπειρον* as a positive attribute of "the solitary one," they used it in the sense of "the indefinitely many" in opposition to "a definite plurality." Anaximander had taught that the primal principle of matter was that which was characterised by the extreme of simplicity, and had made use of this term *τὸ ἄπειρον* in connection therewith. Some claim that he applied it directly to his *ἀρχή* or principle of being; if so, it must have been in the sense of "unknowable, undistinguishable, inexperienced, simple." Others assert that it was substance with determination, having a middle nature between the "water" and "air" principles of Thales and Anaximenes. Aristotle and Theophrastus say that it consisted of a mixture of unchangeable elements; and more claim that Anaximander had left the nature of the *ἄπειρον* undetermined. However the question may be decided, it is certain that the Ionic School had laid the foundation stone of being, and left it so for others to build upon and evolve the phenomenal from the abstract. The Pythagoreans took up the task. Change, to occur, should be a passing over from the abstract to the less abstract, from the simple to the less simple, from the one to the more than one. This passing over would embrace both matter and force, since action would of necessity include the acted on; and while not the first cause of change, it was the direct result of the movement of the first cause.

To this *passing over*, or *becoming*, as it is better known, the Pythagoreans gave the name of *πείραϊνον*; to its opposite,

the not-passing over or not-becoming, they applied the term ἀπείρον; and from the combination of these two all things are produced according to the words of Philolaus, “φύσις δὲ ἐν τῷ κόσμῳ ἀρμόχθη ἐξ ἀπείρων τὲ καὶ περαιόντων, καὶ ὅλος κόσμος καὶ τὰ ἐν αὐτῷ πάντα.” “But from the not-becoming and the becoming is composed the essence in the Cosmos, and the entire Cosmos, and all the things therein.”

The sentence is a remarkable one, since it not only shadows out the next two mythological symbols, the Æther as φύσις and the Hemera as ὅλος κόσμος, but also establishes the identity of the περαιόντα and the ἀπείρα with Erebus and Nox,—these latter being the immediate born of Chaos, and the parents of Æther and Hemera; the περαιόντα and ἀπείρα being the immediate born of the oneness, and (as Philolaus says) the parents of φύσις and the ὅλος κόσμος. This, coupled with the additional fact that the ἀπείρον is mentioned by Archytas as partaking of corporeity, removes this latter equally with the περαίνον from any parity or opposition with pure being, and leaves them as the becoming and not-becoming, the antitheses of each other, as much so as are Erebus and Nox. For what is Erebus or Evolution but a passing over (περαίνω) from the simple to the less simple and from that to the complex, the more complex, and so on? And what other antithesis has this except Dissolution or Nox? The dark antithesis is older than the bright one, or, as the myth says, Nox is the eldest born of Chaos, for if, numerically speaking, the Chaos be one and Erebus a solid two, then must Nox be $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, &c., or the countless parts between the two which, however far they depart from one number and approach the other, will still never quite make a whole one; singly or totally there will be a residuum lacking in order to make unity; singly or totally they can never coalesce with the 2 so as to make 3. Hence it is that Parmenides calls Chaos “the solitary one,” Nox “the indefinitely many,” and Erebus “the definite plurality;” hence too it is that Heraclitus calls Chaos “the one,” Erebus “the whole, the coalescing,” and Nox “the not-whole, and not-coalescing.”

As we can conceive evolution not only as a continuous becoming, but also as non-continuous, or as being evolved to a certain point and then stationary, we have not far to go in order to find what is meant in a physico-metaphysical sense by the not-becoming. The ground is already broken for us in Mythology, since we find the ἀπείρων taken altogether is Nox or Dissolution, and that the ἀπείρα are the offspring derived from her, such filmy fabrics of corporeity as destiny, responsibility, death, sleep, doubt, woe,

“Or any other of that heavenly host
Set down in cloudy throne to do the world some good.”

As positive and immanent as are the fractional parts between one and two, they run in goodly measure through the web of all existence, and yet are of themselves incapable of constituting actual existence.

Thus, by gradual advance, was the knowledge of pre-Hesiodic days unravelled, tested, and approved. From the time that Thales started on the quest and that Anaximander had identified the simplicity of being with Chaos, a full century elapsed ere the Pythagoreans identified becoming and not-becoming with Erebus and Nox. But in symbolising the Deity as the One, and in representing the fundamental principle of matter as one, there was grave danger that, outside the Pythagorean circle, God and matter would be confounded with one another in the minds of men. There was also the apprehension lest the ἀπείρων, instead of being relatively opposed to the πεπαίρων and signifying the not-becoming—as the Pythagoreans intended—would be construed as an opposition of being, that is, as not-being or nothing. To combat such false notions was the endeavour of the next school, the Eleatic.

Xenophanes.—Flourished about 540 B.C. He maintained the unity of the Deity, and all his sayings savour as much of theology as of philosophy. The most important of these sayings are: “There is one God, greatest among gods and men, neither in shape nor in thought like unto

mortals." "From earth all things are and to earth all things return." "From earth and water come all of us." "All things are matters of opinion. . . . That which I say is opinion like unto truth."

Parmenides.—Born 518 B.C. He is supposed by some to have been a disciple of Xenophanes, and by others of Pythagoras; and is spoken of with much respect by the philosophers of his own and subsequent times, so much so that a Parmenidean life became synonymous with a Pythagorean one for uprightness, truth, and virtue. He wrote a poem—part of which has been lost—which he divided into three parts, a Proem, Truth, and Opinion.

Let us follow out the poetical conceit.

Perplexed by the varieties and mutabilities of this fleeting world, and eager for true knowledge, he is conducted by the Heliadic virgins on the road from darkness to Light, to gates where the paths of Night and Day separate;—that is, he comes in thought to Æther where Nox and Hemera are separated by the barrier between the two. Dikē, the law of being, unbolts the gates of the vinculum, and an unnamed goddess appears upon the threshold who tells him that he must study and write of all things, of the Truth which is certain, and of Opinion which is uncertain, yet valuable as a searcher after truth. "Look upward!" and she points towards Chaos. "Behold the truth of Being,—being abstracted from its formal robes. Write what you see." And he wrote:—One, simple, and indivisible is pure being, continuous, unchangeable, and indestructible; object and subject, it is the solitary one of matter and thought; generated not,—neither from being, for being cannot precede itself (save to the re-echoing hearing, ἡχέουσα ἀκουή); nor from not-being, for such is inconceivable (save to the mentally blinded eye, ἄσκοπον ὄμμα),—created it must have been.

"Well hast thou written, O philosopher, and well has the λόγος guided thee to a conclusion. And now look downwards on this other path, and write as best thou knowest."

And looking down upon all the generations below Hemera or Day, he wrote in this wise:—What I have already seen and written of is the one, the real, the knowable, and the all-worthy of being known; and in this canon, *ὅν ἔστι, μὴ ὅν οὐκ ἔστι*, lies the Truth, and the sum total of the Truth. But what I now behold is no longer the one and simple, but the many and the multiform, the changeable and illusive, the all-appealing to my senses, the all-distracting to my reason. So that in what I further write let no man place implicit credence, since my words are but opinion, and even golden opinion is but like unto the truth.

The poet-philosopher goes on to show that the *Δαίμων* or first of gods (= *δαήμων*, “knowing,” from *δαίω*, “to light up, to portion out,” and hence the Plan of creation) devised Eros first, and after him the other gods. So long as the “solitary one” (Chaos or the *ὄν*) and the “indefinitely many” (Nox or the *ἀπείρον* of the Pythagoreans) are absolutely separated, determinate results cannot appear; but when a “definite plurality” (Erebus or the Pythagorean *περάλινον*) is interpolated between the two, coalescence and consistency arise, and determinateness ensues.

While he thus refers vaguely to the becoming and the not-becoming, he regards them neither in the light of first cause nor of principles, but rather as occupying a neutral state between the abstract and phenomenal. He lays down two primary forms (*μορφαὶ*) from which the phenomenal world appears—(1) the ethereal fire of flame (*φλόγος αἰθέριον πῦρ*), which is gentle, subtle, and homogeneous,—the Æther of mythology or primal Light; (2) the cold, dense, and heavy structure (*δέμας*) of darkness,—the Hemera or Cosmos of mythology. Different writers refer to the two as heat and cold, fire and earth, but only by way of example and in allusion to the nature of light and the material frame of the universe. Parmenides looked upon the first as active, real, and animating; and on the second as passive, unreal, and inert, and as only attaining reality when animated by the first.

The whole Cosmos is thus filled with light and darkness; the opposing principles in the two are harmonised by Eros; of these two all things consist and by them are they characterised; degrees of organisation are due to the different proportions in which they mingle; and what symmetrical composition does for each of the multifarious members of the animated kingdom, intelligence does for man, (ὥς γὰρ ἑκάστω ἔχει κρᾶσις μελέων πολυπλάγτων, τὼς νόος ἀνθρώποισι). While the consciousness and thought of the phenomenal world are to be deduced from the coalescence of the two primordial forms, this thought must be separated in a sense from the thought which is coincident with the ὄν or pure being.

Finally, all intermingling of every kind between the two primary μορφαὶ is directed by the Δαίμων, or Plan, which reigns in the midst of all (ἐν δὲ μέσῳ τούτων δαίμων ἡ πάντα κυβερνᾷ), and is the origin of fateful growth and combination (σττυγεροῖο τόκου καὶ μίξιος ἀρχή).

Zeno.—Born 488 B.C. The μὴ ὄν, not-being or nothing, which Parmenides had contemptuously dismissed with the denial not alone of its parity with the ὄν, but of affirmation in general, seemed worthy of more attention to his pupil Zeno. He established the nullity of the μὴ ὄν beyond a doubt, and in no small degree through a series of ingenious paradoxes, Achilles and the tortoise for instance,—so ingenious as to make Plato call him the Eleatic Palamedes. To assume that they were a source of perplexity to the brain that contrived them is absurd; they were evidently intended to emphasise his master's words as regards the futility of assuming not-being or of putting it on a par with being, by showing how plausible to "the re-echoing hearing" and to "the careless eye" statements can be made involving the infinitely divisible and the infinitely great, space and magnitude, the deception of the senses, motion and rest.

Heraclitus.—Flourished about 513 B.C. Though it would appear as if the Chaos had been viewed in all its aspects by the Eleatic and preceding schools, there was still

another phase pertaining thereto which suggested itself to Heraclitus as a basis for his philosophy. If this Chaos, he reasoned, be what its derivation implies, the $\chi\alpha$ of all, the holder and releaser, source and refuge, the "salve" and "vale" of all things, then must Being be conceived as an endless chain, a continuous flux and change from the one to the many, and from the many to the one. He thus recognises the Eleatic $\delta\upsilon$, but with him it is an $\delta\upsilon$ actuated from the beginning by a mythological Eros—a very flux ($\rho\acute{\epsilon}\omicron\varsigma$) in name—that is (as Hesiod mentions) $\kappa\acute{\alpha}\lambda\lambda\iota\sigma\tau\omicron\varsigma$ and $\lambda\upsilon\sigma\iota\mu\epsilon\lambda\acute{\eta}\varsigma$, "harmonious and relaxing" at the same time, by a condition or tone possessed of agreement or accord and of disagreement or discord.

Hence it happens that all becoming must be the result of one in its opposite determinations, or of Eros agreeing to disagree with itself. "The one," says Heraclitus, "setting itself at variance with itself, harmonises with itself, like the harmony of the bow and viol." "Strife is the father of things," is another of his sayings; and still another, showing how all things come from and again return to Chaos through the medium of evolution (Erebus), of dissolution (Nox), and of the harmonious-discordant Eros that pervades all, runs thus: "Unite the whole and the not-whole, the coalescing and the not-coalescing, the harmonious and the discordant, and thus we have the one becoming from the all, and the all from the one."

It is his so-called principle of Fire that distinguishes the Heraclitic philosophy from preceding schools; and an attentive perusal of his doctrine leaves little doubt but that this principle is the mythological Æther or primeval Light.

In the first place he states that this Fire is the complete embodiment of the process of becoming; and as the Pythagorean Philolaus has already said that the product of the not-becoming and the becoming is the essence ($\phi\acute{\upsilon}\sigma\iota\varsigma$) in the Cosmos and the entire Cosmos, this Fire and essence must be identical. But the product of the not-becoming and the becoming, or of Nox and Erebus, is

Æther and Hemera, and this Æther has been shown to be symbolical of primeval Light—the one most subtle and imponderable substance that, as *lumen* and *lux*, appeals to mental and sensible vision, and which Ovid, with the same feelings as Heraclitus, has described as fire :

“*Ignea convexi vis et sine pondere coeli
Emicuit.*”

As the first possible sensuous principle of being, then, the remark of Aristotle is significant, namely, that Heraclitus selected fire in the same way that Thales selected water, and Anaximenes air. Remembering that Light was the work of the First Day, that the simplest form of stellar bodies is luminous gas out of which are evolved by condensation the stars, our sun, the planets, and our earth, and that while this luminous gas is the first manifestation of phenomenal matter in the heavens it is extinguished when the elements are fully differentiated and a crust is formed,—remembering these points we shall have a better conception of the philosopher's own words when he describes this Fire as the principle of existence, out of which all things grow by way of a quasi-condensation, “a clear, light fluid, self-kindled and self-extinguished.” He marks the nebulous phase of matter by saying that Fire assumes the shape of water previous to that of earth; and he distinctly affirms that the manifold is due to hindrances of this Fire and to its partial extinction, the extreme product of such being our earth. This Fire it is that pervades, inheres in, and constitutes the ground of all phenomena, life included. It manifests itself in different forms, is ever passing into new forms, and is the essential factor in keeping up a state of continual flux or change. Still there are periods of possible repose, for, as the descending lightning meets the upward heat, and order again succeeds the temporary resolution of matter into elemental rest, we are told how harmony occasionally results from the downward motion of some part of the fire encountering the upward motion of another part, and how this quasi rest is the result not of accident but of law and order. Outside this quasi rest the

totality of things is in an eternal flow. In the heavens there is no rest: nebulae are breaking up, star dust is condensing, the so-called fixed stars are all in motion, and planets whirl round a sun which itself is not at rest. On earth there is no rest: the waters are ever descending and ascending in circles of distillation and evaporation; the air is unceasingly kept in motion by rarefaction and condensation, by winds and storms, by tides and currents of its own; the land is ever being swallowed by the sea, and the sea is in turn robbed of its domain by land. Among living forms there is no rest: their constituent atoms are continuously combining, separating, and again combining into new arrangements during life,—they are, and they are not; and death affords no end to the cycle of change. “The creation of a plant,” says Dana, “was the simultaneous institution of life and death—the establishment of an incoming and outgoing stream to be in constant flow as long as the kingdoms of life should last.” Somewhat the same thought was uttered ages ago by Heraclitus: “Into the same stream we descend, and at the same time we do not descend: we are, and also we are not. For into the same stream we cannot possibly descend twice, since it is always scattering and collecting itself again, or rather it at the same time flows to us and from us.”

Empedocles.—Flourished about 444 B.C. But,—said Empedocles, following out the train of thought suggested by Heraclitus,—if this Chaos be the holder and releaser of all things, it must have contained within it from the first, though undistinguishable and motionless, the independent and unalterable materials of all matter, the four radical forms of phenomenal being (τέσσαρα τῶν πάντων ῥιζώματα), that is, the solid, fluid, gaseous, and the ethereal or fiery. Nothing new outside of these four root forms can flow from or back to the solitary ὄν; in their aggregation and segregation lie the processes of growth, increase, and decrease; and the organic structure of plants as well as the flesh, blood, bones and nervous structure of animals varies with the different proportions in which the four

combine with one another. Since their nature is thus one, and all are links of the one chain, plants and animals are possessed of their own measures of sense and understanding. In man alone does the mind culminate, and in him is its peculiar seat; but even in man the mind, as dependent on and intermingled with the body, varies with its changing conditions.

The active agencies of Empedocles, though two in number, are essentially the same as that of Heraclitus, the only difference being that the accord and discord of Eros are considered as original entities independent of each other, and not as manifestations of one and the same fundamental power. These two are called by different names, probably to denote the various stages of evolution when they became prominent. The first, for instance, is called *Φιλίη*, *Φιλότης*, *Ἀρμονίη*, and *Στοργή*, that is, Love or Agreement, Affinity, Union, and Affection; the second is styled *Νεῖκος*, *Δήρις*, and *Κόρος*, that is, Disagreement, Division, and Disaffection.

Originally, runs the Empedoclean narrative, (one in which are readily traced the workings of such world-making forces as condensation, contraction, and division), the four roots of matter and the two potentials co-existed as a mighty sphere in which all six were absolutely undistinguishable from each other, and in a state of complete rest. This condition prevailed while Agreement predominated and while Disagreement was inactive. But as the latter grew more influential, it commenced to display increased energy until, from "guarding the extreme ends of the sphere," it gradually pressed from the circumference to the centre and broke the bonds which had hitherto rendered the four radicals alike and motionless. These latter, separated by one potential, were again united by the other; and through a series of such combinations and divisions arose the phenomenal world. While strange forms of organic being appeared at first, they did not continue long, permanence for any considerable length of time being obtained only by those structures whose parts were properly adapted to each

other in conformity with the original Plan—for Empedocles also alludes to the *Δαίμων*, which passes through all nature, nowhere finding a home, as also to periodical changes in the formation of the world.

Democritus.—Born 460 B.C. As Thales and Anaximenes may have been led to their primordia by supposing that the first substance evolved to appearance in our universe was the base of all, so may Democritus have been guided to his theory; but, instead of taking an individual Titan like Oceanus, he took the children of Gæa as a whole, and abstracting magnitude from these molecules he formed the conception of indivisible atoms as the basis of all being. His doctrine runs thus :

All that exists, both physical and mental, is derived from the Fulness (τὸ πλήθος), the Void (τὸ κενόν), and Ἀνάγκη. The fulness consists of atoms which are unchangeable, indivisible, impenetrable, infinite in number, capable of extension, homogeneous as to quality, diverse as to form (and to density, according to some writers), and the ultimate material of all matter and of all mind. The void is the space intervals between the atoms, which keeps them separate and impenetrable; and this void must be considered as possessed of being, equally with the atoms. Ἀνάγκη is the principle, co-eternal with the fulness and the void, whereby the atoms were originally enabled to come together and combine in various ways: this motive principle is called Τύχη.

Apparently new though this Atomistic doctrine may sound, it is but the myth over again, and the myth in its simplest rendition. The void or τὸ κενόν is evidently the χάος, both terms being equally linked with χαίνω “to gape”; the fulness or atoms is the abstraction of the Titans born of Gæa; and the ἀνάγκη is again the Eros, the former being the aorist form of φέρω just as Eros is the present. So that when Hesiod declares that Chaos (formless being) was first, and in it were Gæa (matter) and Eros (force), Democritus repeats the self-same assertion by

saying that the void was first, and in it were the fulness and ἀνάγκη.

The vulgar idea of "chance" is as inapplicable to τύχη as is "necessity" to ἀνάγκη; and Democritus himself expressly says that the common acceptance of chance is but an apology for one's own want of knowledge (πρόφασιν ἰδίης ἀνοίας), and the invention of those who are too indolent to think. His τύχη, related as it is to τυγχάνω, "to happen," and to its cognate τεύχω, "to prepare, to construct," is more likely to be the uncognisable reason for all happening, and would thus have reference to the Plan of Creation in its inscrutable workings. Beyond the idea involved in this Plan or τύχη there is no beginning, say the Atomists, for a beginning of the Infinite is inconceivable.

The philosophy goes on to state how the four radical forms of Empedocles are produced by the preponderating attraction of similar atoms, and how real combinations arise wherein the atoms still continue to be separated from one another by the void,—that is, by pores. Sensuous perception is due to there being given off in all directions from external objects images (εἰδωλα) which enter the organs of sense. The soul, the origin of life, consciousness, and thought are derived from the finest and most spherical of the ethereal or fire atoms. All human knowledge is uncertain; that from the senses is obscure, and that from mere reason is darkened owing to the soul's admixture with the body. A purer and higher knowledge is the thought directed not to the phenomenal but to the beginning of things.

Anaxagoras.—Born 500 B.C. His cosmology is as follows:—

In the beginning was the νοῦς; co-eternal with it were the seeds of all things that have been and now are, endless in number, infinitesimal in size, and contained in a Chaotic mass where the homogeneous and heterogeneous were inextricably mixed and undistinguishable from each other. The segregation and summation of these constituent parts (ὁμοιομερῆ) into such totals as solid, fluid, gaseous, and

ethereal, was the work of *νοῦς*, and was so accomplished that every object in nature is still more or less of a mixture, and is what it is only through a preponderance of certain original homogeneous elements. This *νοῦς*, Anaxagoras tells us, was not the creator of matter. Co-eternal with the Chaotic seeds, it, the *νοῦς*, was most subtle and refined, cognoscent in itself and the principle of all cognition, and stood apart from all things, pure and independent, until its first appearance as manifested rotatory motion in the mass.

Much of this, so similar to the Atomistic doctrine as to suggest that Democritus borrowed from it in part, has evident reference to the myth, the Chaotic *ὁμοιομερῇ* of the one writer representing the Chaos and Gæa of the Theogony, just as did the void and fulness of the other. It was in regard to the Eros which was also in the Chaos that the two philosophers differed.

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In orderly continuation of the symbols and the myth he tells how the division into warm Ether and cold mist (*Æther* and the nebulous *Hemera*) first broke the spell; how the misty nebula, with increasing cold, gave rise to water, earth, and stones; how the seeds of life that floated in the air were washed down by the rain and produced vegetation; and how animals, man included, sprang from the warm and moist clay.

The *voûs* was triumphant! Whether exalted to subjectivity by the Sophists, or brought back to the objective by Socrates and his disciples, or confused with the Divinity by the Stoics, the Eros of Mythology was henceforth recognised as the symbol of *mental* force.

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its way. But not one step beyond the two metaphysical goals did it go, and the final result was—what? That the keenest minds and the most subtle reasoning had found nothing which had not been thought of before, reasoned on before; and that the sum and substance of all metaphysical conclusions had been crystallised by the unnamed and forgotten dead into this

Θεογονία.

Χάος (Γαῖα, "Ερος)	
"Ερεβος	Νύξ
Αιθήρ	Ἡμέρη

Here at the head we find the ἀρχή and the ὄν, the oneness, the deep whence being flows and ebbs, the unruffled mooring-ground of nature's radicals, the void; and in this Chaos is the formless Gæa, that one abiding thing which lies at the basis of all matter and does not change, whether it be fluid, gaseous, earthy, ethereal, or a homogeneous combination of all four, or atomic fulness, or homœomeric seeds; and in this Chaos is also Eros, whom Heraclitus pictured as the hypotenuse to the sides, and Empedocles as the sides to the hypotenuse, whom Democritus called Ἀνάγκη, and Anaxagoras proclaimed as the independent νοῦς.

Coming to the second link in the chain of being we find Erebus and Nox as the first result of mind passing over to matter; this Erebus or continuous evolution that has been variously called the περαινόν, the definite plurality, the whole, the coalescing, the becoming, the metastasis of being, the combination of things; and this Nox or dissolution who, with her fateful brood, oscillates between the abstract and the concrete, who is absolutely at rest though relatively in motion, and who in contrast to Erebus has been styled the ἀπείρον, the indefinitely many, the not-whole, the not-coalescing, the departing, the separation.

And, lastly, in bold relief stands out the Æther which Philolaus calls "the essence in the Cosmos," the φύσις

derived from the ἀπείρον and περαίνον; that greater Light to whose gates Parmenides was transported by the virgins of the sun, and which he described as "the ethereal fire of flame;" that allotropic Fire which Heraclitus expounded scientifically as incandescent gas, metaphysically as the completion of the becoming, and religiously as—to use Milton's words—"Holy Light! bright effluence of bright essence increate."

As a précis of metaphysics the symbols are unrivaled; as a syllabus, they are without an equal; and taking (as we may) the title Θεογονία, "the works of God," in connection with these symbols, the whole bears a curious resemblance to the Genesiac narrative when written thus:

In the beginning God created the heaven and the earth.

And the earth was without form and void;

And the Spirit of God
moved upon the
face of the waters.

And darkness was
upon the face
of the deep:

And God said, Let there
be light: and there was
light. And God saw the
light, that it was good:

And God divided the light
from the darkness. And
God called the light Day,
and the darkness he called
Night:

and the evening and the morning were the first day.

So striking, indeed, is the likeness as to suggest some inner connection between the two, and to warrant the inquiry as to whether the Hesiodic outline was not derived from the older Scriptural, or the two from a pre-existing narrative of much greater antiquity. But this would open up another field of investigation, a large one too and most important, namely, the true religious belief of the philosophers and classic poets. Pagans they certainly were not, for they openly taught the existence of one Supreme Being, and many of them were daring enough to defy fines, imprisonment, exile, and even death, in endeavouring to throw a proper light upon the idols of the people. But, it is often asked, if they had cognisance of and belief in the Trinity and a Christ to come, why did they not exhibit it

in their writings? Perhaps they did ; and the same words and symbols that struck the demotic ear and eye in one sense may have struck the initiated in another. The subject is an extensive one and we can only allude to it here ; but a few examples will best illustrate our meaning, and the possibility to which we refer.

Ovid opens his *Metamorphoses* with the line

Ante mare et terras et quod tegit omnia cœlum.

This, by transposition of the letters, becomes

Ante Deus cœlum et terram atq' omnia ore tegit.

“In the beginning God clothes heaven and earth and all things by his word.”

The *Theogony* begins thus :

Ἦτοι μὲν πρότιστα Χάος γένητ'

Transposition alters it to

Χριστός γὰ ποιμήν ἐντ' Α τε Ω τε

“Christ, indeed, the shepherd, is both the Alpha and the Omega.”

In the same fashion does the celebrated dictum of Parmenides,

ὃν ἔστι, μὴ ὃν οὐκ ἔστι become *τὸ μείον κέντ' Ἰησοῦς*

“Jesus is called the Lamb.”

Here is another, strikingly recalling the well-known *ἰχθύς* in its relation to the initial letters of *Ἰησοῦς Χριστός, Θεοῦ υἱός, σωτήρ*. The triple interwoven triangle, or star-shaped pentagon, with the letters *υ, γ, ι, θ, α*, at its prominent



vertices, was used as a symbol or sign of recognition by the Pythagoreans, and was generally called *Pythagoræ figura* from having been referred to by Pythagoras himself in connection, it is supposed, with the oath of his sect. The figure, as being

three in one, is very suggestive of the Unity and Trinity ; and the letters form the initials of *Ἰησοῦς, υἱός Θεοῦ, γένητο Αλφα*, “Jesus the Son of God, was the Alpha.”

CHAPTER VI.

MIND.

Prometheus. It is observable how closely all the philosophies have associated the primordial Eros with Light, and through this Light with human thought. Judged as a whole, the inert Eros would appear to be the active Æther which, when commingled with the phenomenal world, manifests itself agreeably to the conditions requisite for an allotted end. In the universe it exhibits its preponderating influence in the bringing forth of gravitation, figure, divisibility, and chemical energy, (Hecatoncheires and Cyclopes); and as these forces act according to fixed laws whereby the Cosmos is divided into systems, shaped as to figure and orbits, and bound together by mutual attraction, the universe is a rational whole,—or, as mythology puts it, is possessed of an *anima mundi*.

Again, in the elementary construction of our globe, the Light would so impress itself on molecular matter as to give this latter an aptitude for actualising itself to the furthest point consistent with the purposes of earth as a whole, and with the nature of each individual kingdom in it. In this way Gæa would bring forth an Iapetus who would in turn produce an Atlas and a Prometheus; or, in other words, matter would bring forth a molecular aptitude whereby there would arise a rotating and revolving oblate spheroid for the mass, and a *mens* or mind pervading the entire scene of elemental working, mineral, vegetable, and animal. In the mineral, the least porous of the three and hence the most obdurate to Light, the mental aptitude would display itself most prominently as impressibility, magnetism and electricity. “The magnet has a soul,” said Thales of old; and this

insouling of inorganic matter by the *Lumen de Cælo* is being rendered more manifest and more general by the magnetic and electric discoveries of to-day. In organic bodies the Light finds a more open and congenial field, and one in which the chemical process is overcome by the living one. As a consequence the mental aptitude breaks forth as growth, propagation, and irritability in vegetables; advances to sensation, locomotion, and instinct in animals; and culminates in man as thought or reason. Mineral being and human being are thus, as it were, the opposite poles of mind, and the Promethean spark which first lay stiffened, chained, and crystallised in the rock bursts forth ultimately and after a long series of gradations as the living, free, and conscious Ego.

Modern philosophy arranges mind under four principal divisions, sensation, emotion, volition, and intellect. The last of these, embracing memory, reason, abstraction, judgment, imagination, &c., is the highest, the most evolved form of mind, and was reserved for man, the most evolved of animal beings. The other three he has in common with the members of the animated kingdom; and being the last of created works, he may even be considered as having appropriated a modicum of fear, hunger, pleasure, desire, &c., from pre-existing beings. It was thus that Horace reasoned, when he wrote in Ode i. 16, 13.

Fertur Prometheus, addere principi
Limo coactus particulam undique
Desectam, et insani leonis
Vim stomacho apposuisse nostro.

We have used the words "animated kingdom" instead of "animal kingdom" designedly, for just as we notice and speculate on the insensible gradation of the vegetable into the animal kingdom, and are inclined, almost compelled, to grant a certain degree of sensation, emotion, and volition to such plants as Venus's Fly-Trap, the Moth-Catching Plant, and to many others remarkable for their curious irritability and movements, so too did the later

writers add to existing mythology by describing Prometheus as assisting Zeus, or early vegetable life, in the war against the Titans, and as having Minerva, or organised being, for a staunch companion, the one celestial who appreciated his capabilities and aided him in his efforts to ascend from earth to heaven, from a lower to a higher sphere of existence.

If irritability and movement be manifestations of mind, and it is generally conceded that they are, we cannot brush aside unceremoniously certain assertions made by philosophers, both ancient and modern.

Darwin, for instance, maintained that plants are but inferior animals, and that they, or some of them, have a brain, a stomach, and a low form of sensation residing in the pith, the analogue of the spinal marrow of animals. Fanciful though it may sound, this doctrine is difficult to refute in some respects, and the difficulty is increased when in addition to irritability and spontaneous movements, we notice other unaccountable phenomena on the part of plant forms,—how soil can change the colour of their flowers; how sea-weeds in the depths of ocean, where light can have very little if any effect, are found nevertheless possessed of the most brilliant green and red tints; how fragrant odours are given off from flowers, leaves, bark, etc., in a manner not yet explained, unless it be that, as some botanists profess, fragrance is but the excrementitious matter thrown off by the living plant; how they differ in taste, how they evolve heat, luminosity, electricity; and many other equally curious phenomena.

If such considerations influenced Darwin to extend the sphere of mind to vegetable life, we cannot scoff at the extension of it to the earth itself, which as a whole is notably possessed of irritability and movement.

If those last-named qualities be a form of mind, no matter how low, then our Earth, the *Γαῖα πελώρη*, by right of its diurnal and annual movements, of secular subsidence and upheaval, of earthquake shocks and volcanic outbreaks, can lay claim to a something higher than mere inertness.

There is room for reflection in the following : " Plato, the Stoics, Kepler and others, have considered the globe itself as possessed of vital faculties. According to them, a vital fluid circulates in it ; a process of assimilation goes on in it, as well as in animated bodies ; every particle of it is alive ; it possesses instinct and volition, even to the most elementary molecules, which attract and repel each other according to sympathies and antipathies. Each kind of mineral has the power of converting immense masses into its own nature, as we convert our food into flesh and blood. The mountains are the respiratory organs of the globe, and the schists its organs of secretion ; it is by these latter that it decomposes the waters of the sea, in order to produce the matter ejected by volcanoes. The veins are caseous sores, abscesses of the mineral kingdom ; and the metals are products of rottenness and disease."—*Cuvier*.

But leaving these conceptions, partly allegorical and wholly true in a scientific sense, we find mind restricted, as a rule, to animated beings, presumed of in the vegetable, acceded to in the animal, and universally acknowledged in man.

The association of Zeus, Minerva, and Prometheus is very close, as noticed in the myths, and requires some explanation. Life, as we have seen, made its first appearance in the most primitive of fashions, in the mold and mildew and thousand other fungous forms that, while possessed of animation, could lay no valid claim to organism. But as Life progressed and gained the beneficence of moisture for partner, and when it had absorbed that partner—as Zeus swallowed the Oceanid Metis—the foundation for a better vegetation was laid and the rudiments of organic structure commenced to breed in the highest existing living type,—in the head of Zeus. Organic structure is almost as wonderful as life itself. We trace it back to a single cell, but there are forced to stop. Yet within this cell we know that development is going on, that changes of some nature are working which tend to alter the nature of the cell—that pains are racking the

head of Zeus. But for a space no results are visible. Zeus cannot deliver himself, and is forced to send for a Prometheus to split his head,—the cell would for ever remain a cell and life be for ever unicellular and thallogamous of the lowest type, were it not that some noumenon comes along to split the cell in two. This division is all sufficient, for segmentation once begun organism appears. The reign of the fungous dynasty is ended, and a higher race of plants endowed with *organic structure* and with *chlorophyl* to give colour to the parts, springs into life: *Minerva*, γλαυκῶπις Athene, springs forth fully armed and equipped from the head of father Zeus.

Claudian's remark is suggestive :

Auratos Rhodiis imbres, nascente Minerva,
Induxisse Jovem ferunt.

Was it in return for those services as accoucher that organised existence arrayed itself on the side of Prometheus? And did the irritability and spontaneous movements of early mind conceive an attachment, as the myths hint, for the emerald-eyed (chlorophyl forbids writing "blue-eyed") Minerva? We cannot doubt it. From the first, organic force has ever been in close sympathy with the evolutions of the mind, has kept apace with it from the almost structureless amœbus to the highly structured man, has evolved organ after organ to meet the requirements of an increased intelligence, has been, as it were, a Minerva, or μὴν νεῦρα,—the very ties, or fibres, or nerves, whereby all matter is rendered organised.

One thing is evident, that organic being led the way when once upon a time,—after the sun became a personage, says Mythology; on the Fifth Day, says Genesis, and the coincidence is noteworthy,—Mind girt up its loins and, lighting its torch from solar heat, brought *intelligence and animals* to earth.

A noble achievement surely, and one that gained a name and fame for Prometheus. Hitherto he had been styled ποικίλος and αἰολάμητις; but when he evolved the faculties that distinguish the animal from the vegetable, song,

grateful song which has ever hymned and lauded the glorious actions of the great, bestowed upon him the well-deserved titles of ἀγκυλομήτης and ποικιλόβουλος. And he deserved them. Change its forms and colours and crafty movements as it may, a plant is still a plant. Be it lowly moss or giant oak, daisy modest or blooming rose, morning-glory or night-blooming cereus, there is that visibly lacking which renders it inferior far to the meanest protozoan in existence. This something is *nerve structure*. In the most complex and curiously-developed plant we fail to find a nervous system visible : in all the forms of animal life its presence is assured, is allowed, even though it be not so far detected in those animalcules that occupy the border ground between the two animated kingdoms.

It was Mind, then,—the mind which had possibly so much to do with the pith of life, and which progressively accommodates itself to being,—it was this mind that appropriated or stole for the nervous structure fashioned by Minerva that measure of intelligence without which no animal could have its being, no man his existence, and without which, consequently, artificial fire would be unknown, whether we regard the same as the product of quick combustion or as the fire of knowledge.

“Having concealed it in a narthex” is the way in which Mythology describes the fire as brought from heaven. We have solved one of the two unknown quantities : let us substitute its value in seeking for the other. “Having concealed the nervous structure in a ?” The reader is almost prepared to give the answer. The nerves of animals are given off from *collections of gray matter* called nervous centres or ganglia, which are distributed in various parts of the frame, and symmetrically, according to the type upon which the animal is built. In all cases *the ganglion is but a repository or case of the nervous filaments*, and this is the νάρθηξ of the myth, the νεῦρον θήκη, or “repository of the nerves.” It is well to note in confirmation of the derivation that certain Greek physicians called their treatises on medicine νάρθηκες or ναρθήκια, that is, “on

nervous diseases"; and that the Greek schoolmaster's rod or cane was also styled *νάρθηξ*, showing the opinion, it may be, that the early classical pedagogues entertained about brain and a birch rod!

"Unknown to Zeus did he take it." There is a good deal of suggestiveness in the *λάθρα Δίος* of the prose writer and the *λαθὼν Δία τερπικέρανον* of the poet. The theft which Prometheus committed was of huge dimensions and brought many new and strange subjects under the control of Life. Though, to follow Æschylus, the Titans had still to be subdued on the courts of Thessaly, Zeus was fast becoming a power in the land, was acknowledged as war-lord by the Olympians, and ruled with absolute sway over his vegetable kingdom, such as it was. He must have consequently regarded with surprise and suspicion the new accessions to his ranks, headed as they were by one whose mental capabilities he dreaded and of whose real allegiance he was very doubtful. Life was ever the *εὐρύοπα Ζεύς*, and though he may have despised the ragged crowd of Protozoans that Prometheus brought forward to help him on to victory, his keen glance must have detected the subtle difference between them and his own vegetative followers,—may have even pierced the veil of centuries and observed that though Infusoria occupied one end of this new chain of being, the other end was held by Man and Reason. If so, however, he held his peace till the Titanomachia was fought and won.

And then he acted. "Why should this new race be forced upon him? He wanted no imperium in imperio, and yet he had to accept it. He had never asked for a new order of being." The old leaven, inherited from his sire and grandsire, was breaking out! "He had toiled and moiled, and he bore many a scar, mementoes of the well-fought fray: all he desired now was peace and rest and the nectar and ambrosia that make life pleasant. Why could not this upstart son of an expedient father have remained quiet then, and instead of foraging gray matter from the sources of Helios, be satisfied with the pith

already provided? Pith and gray matter;—irresponsibility and responsibility. Responsibility for Zeus! A thing undreamt of up to this! 'Tis rank rebellion! Let its author be crucified!"

And so the fiat was issued. Prometheus was bound and nailed to a rock, there to suffer for many ages, during all of which an eagle devoured by day the lobes of his liver that grew again by night.

"Within the brain's most secret cells,
A certain lord chief justice dwells,
Of sovereign power, whom one and all,
With common voice we Reason call."

Churchill.

Zeus must have noted well those ganglia from the first. It was not the fish or bird or beast that he dreaded, but what he saw reflected in the depths, the "sovereign power of reason." It was Intellect and Will that Life saw in those "most secret cells," and it was for this intellect and will that Mind was chained and tortured and bound to a rock. It was the same intellect and will that helped it to defy the tyranny of Life and to endure its sufferings.

When Man appeared upon the globe, Intellect was unloosed. As each geological formation has been formed from the preceding, that from the one before, and so on, it follows that the rocky crust which the primitive man trod upon was part and parcel of the first permanent covering that ever settled over the central fire of earth. To this rock, whether Glacial or Recent, that was held in the grasp of the primeval granite, was Mind attached with indissoluble bonds; and no more fitting agent could there be for forging and fastening its chains than Vulcan, the raging heat of centre and surface and air above that prevailed in those days of old,—heat that forbade man's being, heat that nothing but the principle of Mind and its most pristine forms could withstand.

To this granite was he bound, and thence he watched and was watched by the march of centuries. The spread of Centuries! The flight of Ages! What is this but

“the Eagle with wide extended wings” of the Myth? What is *αιετός* but *αἶα έτος*, “the times of Earth,” “the years,” and *αιετός έφεππάμενος* but “the flying years,” and *αιετός τανύπτερος* but “the long spread of flying years,” or “the flight of Centuries”?

The classical metaphor has its modern simile, as seen in the lines of Bishop King :

“Like to the falling of a star ;
Or as the flights of eagles are ;
Even such is man, whose borrowed light
Is straight called in and paid to-night.”

From this Rock of Ages did the Mind observe the living tide roll on. It saw the granite and the gneiss, the red gneiss and the gray, interstratified with schists and serpentine and graphitic limestone, forming in rude and massive beds during the long Archaic Day. And ever through that Day were the forces of disintegration at work, gnawing and rending the rocky surface and destroying bit by bit what had been built up : and ever during the flight of Archæan time was the watching Mind tortured by the eagle of destruction. It came, “the destruction that wasteth at noonday,” with wings expanded and talons sharp, and flecked the rocks with the life juice and remains of animal existences. Strange and lowly though they may have been, unkennd by mortal eye, if we exclude the Eozoon, they represented Mind. Even if we suppose them as possessed of but the merest rudiments of a nervous system, still they represented Mind. It may have been this inferiority, as well as the inferiority of all animals to man, that made Mythology particularise *the liver* of Prometheus as the eagle’s prey. The liver is an organ supplied in common with the other abdominal viscera by the solar plexus of the sympathetic, and receives but a few filaments from the brain and spinal cord : it is consequently endowed with much less movement and sensibility than if it were supplied from the cerebro-spinal system, and the consciousness and will have no immediate control over it.

But the Night came, the Night that ended and succeeded the Archæan Day, the Night of whose workings Geology knows so little save the results that followed and that it lasted for a vast interval of time. Shall we use Brandon's words of it ?

“Who can express the horror of that night,
When darkness lent his robes to monster fear ?
And heaven's black mantle banishing the light
Made everything in ugly form appear ?”

Or Bowring's ?

“The night comes calmly forth,
Bringing sweet rest upon the wings of even :
The golden wain rolls round the silent north,
And earth is slumbering 'neath the smiles of heaven.”

In whatever form it came and however long it lasted, light broke at last and gave to the cohort of the ages another Day,—the Silurian Day, that had the Cambrian for its dawn. And lo ! the granite, gneiss, and schists that had been destroyed by disintegration, have come forth from the workings of the Night, fresh and recuperated, as slates and grits, as sandstone, limestone, shales and conglomerates. And lo ! the fauna that had been devoured by the granite-born eagle—for the monstrous bird was sprung from Echidna, and her we have already identified with the granite—appear in the more evolved shapes of protozoan sponges and graptolites ; of radiated Cystideans, Crinoids, Starfishes, and Corals ; of molluscous Brachiopods and Lamellibranchs, Pteropods, Gasteropods, and Cephalopods ; and of the articulated Annelides, Entomostraca, Phyllopoets, and Trilobites. The lobes of the chained one's liver had grown in very truth, and grown in all directions, “τὸ δ' ἀέξετο ἴσον ἀπάντη νυκτός.” But with the Day came disintegration's agencies again, and once more the Mind heard the dreadful whirring of Life's destroying bird, once more was witness of the carnage that water, air, and storm, that rain and lightning and natural decay, that pestilence and brute force and cunning made among its own creations : once more did the eagle

devour the lobes and cause the rocks to weep with Promethean gore.

Again—

“In sable pomp, with all her starry train,
The Night resumed her throne.”

It may have brought strength and rest and comfort to the rock-bound Mind, but its inmost fibres were intelligent and, though knowing well the torments that were in store, it must have longed for the coming Day and the offspring it would bring. It came, the glorious Devonian Day! with its shales and flags, its mottled limestones and its red, red sandstones. It came, and though it retained the feudal lords of the preceding age, the aristocratic Cephalopod, the Orthoceratous viking, and the wonderful-eyed Trilobite, it brought that with it which ended for ever the dynasty of the Mollusk,—it brought a vertebrated being. Surely Mind must have sent up a pæan when it beheld the *Coccosteus* and *Pterichthys*, the *Asterolepis* and *Cephalaspis*, disporting in the waters and clad with coat of mail that cunning armourer of to-day could never fashion! What though they were but fish! They had a jointed skeleton, a spinal column, and a brain. What mattered it if tortures hitherto unknown racked the whole Promethean frame when the eagle came, true to its time and mission, and clawed and pecked the liver rendered now more sensitive by the pneumogastric and the phrenic? The *Man* within the Mind was stirred for the first time from his long, long lethargy.

And thus the precession of the Ages went marching on. Through the Carboniferous, Triassic, Jurassic, and Cretaceous, through the Eocene, Miocene, and Pliocene, on it went, Day following Night and Night the Day; Day bringing disintegration and dissolution; Night, reconstruction and evolution. The liver was still the eagle's prey by Day, but it ever grew through Night, and ever in all directions. It evolved in the Radiates, the Mollusks, and Articulates; it evolved in the Vertebrates, bringing to life the fish, the reptile, the bird, and, last of all, the

Mammal. And now once more within the Mind was Man stirred up from the deep sleep that had succeeded lethargy. Henceforward he but slumbered, for the end was nearing.

The myth tells us how the end occurred : how Hercules, having killed the eagle, freed Prometheus from his bonds with the consent of Zeus who thus permitted Hercules to obtain greater renown than ever.

There came a Day when the rocky surface of our globe was fitted for the highest order of terrestrial being. There surely came a Day when Man roamed at large upon those rocks. On that Day was Mind unfolded to its furthest capabilities ; and Prometheus, freed from the chains—the irritability and movement, sensations and emotions, instinct and volition, from the all that was common to animated being—shook off the last shackle that enfeathered him, and casting it off gave Reason to the world, and with that reason, Immortality, the gift of Chiron, as the myth relates.

“ And this was done with the consent of Zeus,” οὐκ ἀέκητι Ζηνὸς, as Hesiod tells us. By this time Life had conquered all his foes, had grown older and more experienced, more cognisant of his own power and less alarmed at the advent of a new being. He had seen the gradual procession of plant and animal forms that occupied in turn the sea, the land, the air, and felt that he had received as much obeisance from the lepidodendron as from the mushroom, from the ichthyosaurus as from the sponge. And as in the past, so was it now. Here were those lately arrived exogens, the oak, the maple, the elm, and the plane ; and here were the mammoth and the horse, the leviathan and the seal, the dodo and the singing bird. Did they fail aught in obedience and respect for Zeus ? Not a whit ; on the contrary, the finer they grew in fibre and the more evolved in structure, the more did they seem to cling to life. How, then, would it be with this rational idea of Prometheus, if set free ? Would its corporeal possessor cling to life, or would the ethereal indweller urge him to

draw distinctions and incline his aspirations to the older gods, to Æther and the Eros? Even so, it was only through and by means of life that the thing of clay could see the light here or hereafter. Let Man come then. What had Zeus to fear? If this vitalised clay clung slavishly to life, it was nought to Zeus; if this human being worked loyally for life, it would redound to both; if this Man aspired to Light and Love, to Æther and Eros, then man should work during life's pleasure with fear and trembling. Let him come, and with no niggard greeting, to the banqueting house of Life. The ox, the sheep, and the wild goat would welcome his presence; roses and lilies would strew his path; the fig tree would give him shade, and the vine would glad his heart. Man could add nought save reason to the wondrous works of life.

Still another reason for Life's not being unwilling was that the marvellous results of earth's great movements in the past might be manifested,—or, as the myth says, that the renown of Hercules might be greater than before:

ὄφρ' Ἡρακλῆος Θηβαγενέος κλέος εἶη
πλείον ἔτ' ἢ τοπάρουθεν ἐπὶ χθόνα πουλυβότειραν.

Long since had the Titans been sealed down; later on the Giants had been buried in the Phlegræan fields; and Typhœus himself could now be heard groaning beneath the Ætnean pile. During all these centuries had earth been storing its gold and silver and precious stones, its wells of oil, its salt and gypsum, marble, coal, iron, and metal ore of all kinds; and as yet there had been no creature worthy to receive the key or capable of unlocking the treasure chambers. Now too were the continents developing their outlines to the full, and the seas and oceans lapping their proper bounds; now were the rivers racing from mountain heights to the plains and thence to ocean, and now were the rocks covered with a most fertile soil. Earth and life were alike ready for the Man, and prepared to give him of their best in return for the single jewel which he claimed as birthright.

When was Prometheus delivered? When did Man make his first appearance on our globe? The answer to one question will be the answer to the other. The myth is apparently as indefinite to the precise date as is the science of our day, but it distinctly points to post-tertiary time. The Tenth Labour has already been identified with the Tertiary period, and it was during the latter part of the Eleventh Labour (fetching the golden apples of the Hesperides), that Hercules delivered Prometheus.

Such are the main outlines of this most strange and interesting of the myths, which, owing to its subject-matter, has been variously treated and added to by poet and philosopher.

Hesiod's own account runs thus :

- δῆσε δ' ἀλυκτοπέδῃσι Προμηθέα ποικιλόβουλον
 δεσμοῖς ἀργαλέοισι μέσον διὰ κίων' ἐλάσσας.
 Καὶ οἱ ἐπ' αἰετὸν ὥρσε τανύπτερον· αὐτὰρ ὄγ' ἦπαρ
 ἦσθιεν ἀθάνατον, τὸ δ' ἀέξετο ἴσον ἀπάντη
 5 νυκτός, ὅσον πρόπαν ἦμαρ ἔδοι τανυσίπτερος ὄρνις.
 τὸν μὲν ἄρ'. Ἄλκμήνης καλλισφύρον Ἀλκίμος υἱὸς
 Ἑρακλῆς ἔκτεινε, κακὴν δ' ἀπὸ νοῦσον ἀλαλκεν
 Ἰαπετιονίδῃ, καὶ ἐλύσατο δυσφροσυνάων,
 οὐκ ἀέκητι Ζηνὸς Ὀλυμπίου ὑψιμέδοντος,
 10 ὄφρ' Ἑρακλῆος Θηβαγενέος κλέος εἴῃ
 πλείον ἔτ' ἢ τοπάροιθεν ἐπὶ χθόνα πουλυβοτείρην.
 τοῦτον ἄρ' ἀζόμενος τίμα ἀριδείκετον υἱόν·
 καίπερ χωόμενος παύθῃ χόλου δν πρὶν ἔχεσκειν,
 οὐνεκ' ἐρίζετο βουλὰς ὑπερμενέϊ Κρονίῳ.—Theog. 521.

Prometheus too, the versatile, he held
 In durance vile half driven through the rock
 With bonds most irksome ; and against him urged
 An eagle with a stretch of wing immense,
 That on his deathless liver gorged its fill ;
 And what the bird the live-long day devoured
 As much by night in all directions grew.
 Yet even so its end was brought to pass
 By the well-curved Alcmena's forceful son,
 By Hercules who saved the Titan-born
 From evil plight and freed him from his cares,—
 Olympus-ruling Zeus demurring not,
 So that still greater might the glorious call
 Of Hercules, the vigorous born, be
 Than ere before upon prolific earth.

With such regard this son renowned he loves ;
 Though still disturbed he lulled the rage first felt,
 For that he urged free-will on lordly Zeus.

NOTES.

- 8 *δυσφροσυνάων*—"from irrationality," since *δύσφρων*, like *ἄφρων*, signifies "without intelligence, without reason." In the same way does Apollodorus describe the event, 2. 5. 11. 10. *Καὶ τὸν Προμηθεῖα ἔλυσε, δεσμὸν ἐλόμενος τὸν τῆς ἐλαίας*, "and removing the shackle of irrationality, he freed Prometheus,"—*ἐλαίας* being the Ionic form of *αἰαίας*, for *αἰαίος* as well as *δύσφρων* are employed by Æschylus in the same sense as *ἄφρων*.
- 10 *Θηβαγενέος*.—*ἦβη γένω*, the *θ* merely standing for the spiritus asper, as in *θαμά* for *ἄμα*. Hercules was born of vigour (Alcmene, *ἀλκή μένος*), and wedded after death to Hebe, the goddess of youth and vigour.
- 13 *καίπερ χωόμενος*.—Volcanic and seismic disturbances, elevation and subsidence of the land, and other changes affecting life did not cease with the coming of man; they are occurring even to-day. But they are minor in their way, and neither in intensity nor in range do they approach the vast disturbances of former ages.
- 14 *βουλὰς*.—Free-will, to be such, implies *two* wills; this is denoted in the text by the plural *βουλὰς*.

The *βουλαί* or Free-will leads up immediately to the episode at Mekone, thus pointing to the conclusion that this incident is connected with the Fall in Eden when man's wills clashed with each other for the first time. The poet writes with a license all his own. He goes back to the dim and musty venue of philosophy when the abstract was passing over to the phenomenal, and to this transition stage of being he applies the term *Μηκώνη* or Not-coming (*μή ἦκων*). In this Not-coming, where destiny, death, responsibility, and all the other offspring of the Darkness play so prominent a part, he depicts the great event that was to be, and the personages. Life and Mind are passing from the solitary *ὄν*, are assuming a shadowy existence, and already there commences the struggle between the two for the forerunner of the human race,—whom the poet calls a mighty ox (*μέγαν βοῦν*), just as Æschylus uses *τῆς βοὸς τὸν ταῦρον* in reference to Clytemnestra and Agamemnon. Here, then, in the shadow of being as it

were, with all the attributes and surroundings of an after period, do "immortalised things of sense" prognosticate the future.

Let us try, as best may be, to follow distributively the poet in his conception.

There is conjured from the deep a time, a scene, and a garden fair to view, where Mind shapes forth the future. Here is the glory of his Maker, that μέγαν βοῦν in whom Mind and Life are united to the fullest and the noblest extent ; here too, Tenderness personified and "fair as the first that fell of womankind" is the pleasing abstract of this exquisite connexion ; and here in this garden of the world are fleshs of all kind, of fish, of fowl, of beast,—are the inwards of our globe, marble, coal, and metal ore, gold, silver, and precious stones, crusted with the fatty clay, and some bulging from the surface, others deep in the bowels of the earth. All these, with dominion, were for Life and Life's partner ; but for Life's own self was she reserved who had been taken from his bones and built by hands divine.

Καὶ γὰρ ὅτ' ἐκρίνοντο θεοὶ θνητοὶ τ' ἄνθρωποι
Μηκώνῃ, ἱστ' ἔπειτα μέγαν βοῦν πρόφρονι θυμῷ
δασσάμενος προύθηκε, Διὸς νόον ἔξαπαφίσκων.
τοῖς μὲν γὰρ σάρκας τε καὶ ἔγκατα πίονα δημῷ
ἐν ῥινῷ κατέθηκε, καλύψας γαστρὶ βοεῖη,
τῷ δ' αὖτ' ὀστέα λευκὰ βοὸς δολίῃ ἐπὶ τέχνῃ
εὐθετίσας κατέθηκε, καλύψας ἀργέτι δημῷ.—Theog. 535-541.

For once in the Not-becoming, when that gods
And mortal men were being appraised, he shaped
A mighty creature whom with prudent thought
He had disjoined to tempt the mind of Zeus.
For them it was the fleshs he had placed,
For them the inwards juiced with fat he hid
Within the crust, within the depths of earth ;
For him to boot the creature's naked bones
He placed and fitted in a cunning way,
And covered over with all-shining fat.

Life awoke and came unto his own. For all too short a period did he enjoy the wealth of nature, feeling that life and mind were one, and that she, the soft, the tender, and mature, was another self.

But there came a day when all this happy unity was sundered, when the tender *πέπων* stood below the salt and appealed to Life, an apple in her hand. With inborn intuition did he know that a crisis had arrived,—that his choice should be made,—that this heaven on earth was lost. From one to the other did he look, from the feast of reason and the flow of soul to her his likeness, help, and heart's desire. How glorious one? How vied with it the other? Which must he choose? Must? Could he not, then, choose the *πέπων*? The additional pang marked already the one on whom his thought was centred. Yes; the *βουλαί* battling in his breast made him now for the first time fully conscious of the marvellous gift inherent in him for good or ill; and so strange are the ways of life that in all his pain and anguish he smiled wanly at the new-felt power within his mind for option and defiance.

δὴ τότε μιν προσέειπε πατὴρ ἀνδρῶν τε θεῶν τε
 Ἰαπετιοΐδῃ, πάντων ἀριδείκετ' ἀνάκτων,
 ὃ πέπον, ὡς ἑτεροζήλως διεδάσσαις μοίρας.
 ὦς φάτο κερτομέων Ζεὺς ἄφθιτα μῆδεα εἰδώς,
 τὸν δ' αὖτε προσέειπε Προμηθεὺς ἀγκυλομήτης,
 ἥκ' ἐπιμειδίσσας, δολίης δ' οὐ λήθετο τεχνης·
 Ζεὺ κύδιστε, μέγιστε θεῶν αἰεγενετῶν,
 τῶνδ' ἔλεν ὅπποτέρην σε ἐνὶ φρεσὶ θυμὸς ἀνώγει.
 Φῆ ῥα δολοφρονέων.—542-550.

Soliloquised the sire of gods and men :
 "O apt-born mind, the honoured of all thrones!
 O being soft, so tender and mature!
 How vying each with each hast made the shares!"
 In anguished accents thus did Zeus commune,
 The Zeus who knew the never-changing plans.
 But then spoke him the subtle Mind, and smiled
 A little, mindful of the nice deceit:
 "Most noble Zeus, of gods immortal chief,
 Take which of these the spirit prompts in soul."
 So spoke the tempter.

Life could not plead ignorance. Better, far better than any of his seed did he know the Cosmos and its plans, and the nature of the things around him. But yesterday had he given names to living creatures, to the cattle, fowl, and

beast,—yea, to that last and tearful πέπων now before him,—and that which he called each was its name.

Life could not plead ignorance. The apple offered by the πέπων recalled the high behest, “Thou shalt not eat of it.”

Life could not plead ignorance. In his ears there rang the words, “In the day thou eatest thereof, thou shalt surely die.”

And yet, though reason pointed to wisdom and dominion, and memory to rectitude and divine love, and imagination to the loss of these, to countless ills and death for all his kind, he made his choice and, for better for worse, took that which was but a fair veneer, an outward show, a veritable λευκὸν ἄλειφα.

Ζεὺς δ' ἄφθιτα μῆδεα εἰδὼς
γνῶ ῥ' οὐδ' ἠγνοίησε δόλον· κακὰ δ' ὅσσετο θυμῷ
θνητοῖς ἀνθρώποισι, τὰ καὶ τελέεσθαι ἔμελλε.
χερσὶ δ' ὄγ' ἀμφοτέρησιν ἀνείλετο λευκὸν ἄλειφα.—550-553.

But the Zeus who knew
The plans immutable knew too the snare
And ignorance could not plead ; in mind he saw
The ills for mankind, that they were to be ;—
And yet he clasped a beauty formed to fade.

Repentance came. The lightning, cold, and driving rain, the wild beast's roar, the thorns and thistles of the earth, the daily toil and sweat for bread, and the sorrowful pangs of labour were constant reminders how deceitful is favour, how vain is beauty, and how hard is transgression's path. In many ways did bitter grief fasten in the heart of Life and darkness in his understanding ; but most of all when that for which he erred proved but skin-deep. For as time rolled on with its routine of work and duty, the beauty of the πέπων faded ; “assaulted every hour by creeping minutes of defacing time,” the suppleness and symmetry were lost, the skin grew shrivelled, and the bony framework told a sorrowful story. And gazing on her was the Life who loved her still and murmured the pet name of yore,—the Life around whose own head the cloud of age and death was gathering fast, and who, loyal to the last,

made no reproach save this, "How long, O Lord, how long wilt thou remember our iniquities!"

χόσατο δὲ φρένας ἀμφί, χόλος δέ μιν ἵκετο θυμόν,
ὥς ἴδεν ὅστέα λευκὰ βοὸς δολίῃ ἐπὶ τέχνῃ,
ἐκ τοῦ δ' ἀθανάτοισιν ἐπὶ χθονὶ φύλ' ἀνθρώπων
καίουσ' ὅστέα λευκὰ θυέντων ἐπὶ βωμῶν.
τὸν δὲ μέγ' ὀχθήσας προσέφη νεφεληγερέτα Ζεὺς·

Ἰαπετιονίδη, πάντων πέρι μῆδεα εἰδώς,
ὦ πέπον, οὐκ ἄρα πω δολίης ἐπελήθεο τέχνης.

*Ὡς φάτο χωόμενος Ζεὺς ἄφθιτα μῆδεα εἰδώς.—554-561.

But gloom his mind and bitterness his heart
Possessed when he the creature's nice-planned bones
Distinctly saw. Hence is it that the race
Of men on earth consume with fire bare bones
Upon the smoking altars of the gods.
And sore at heart communed cloud-gathering Zeus:
"O apt-born mind, that knew the plans of all!
O tender heart! Not ever then may be
Forgetfulness of the deceitful way!"
Thus sad spoke Zeus who knew the changeless plans.

The conclusion is brief, pointed, and only too true; for that which we have is no longer the *πυρὸς μένος ἀκαμάτοιο* "the not-to-be-worked-for" or immediate intelligence that Adam had. At best it is but a knowledge of things, gained only by years of study and experience, and liable, too liable to err.

ἐκ τούτου δὴ ἔπειτα, δόλου μεμνημένος αἰεὶ,
οὐκ ἐδίδου μελέοισι πυρὸς μένος ἀκαμάτοιο
θνητοῖς ἀνθρώποις, οἳ ἐπὶ χθονὶ ναιετάουσιν.—562-564.

And hence, rememb'ring ever his deceit,
He did not give the strength of fire instinct
To ill-starred mortals dwelling on the earth.

CHAPTER VII.

THE MEASURE AND THE FOIL OF MIND.

Epimetheus.—The question of sex enters largely into life, the first and broadest distinction of animated forms being that of male and female; and as the former preceded the latter in the case of human beings, it is not irrational to suppose the same priority for the male in all other life forms, plants as well as animals.

In the animal kingdom there is, as a rule, an individuation of the sexes, the exception being said to exist in the case of such hermaphrodites as the snail, tapeworm, and some others of a low order. In the vegetable kingdom we find instances of individuation when the male and female flowers are on separate plants, as in the screw-pine, willow, mistletoe, and other *Diccia*; but in all the *Phænogams* or flowering plants outside this class, the male and female organs are found upon one and the same root. In the *Cryptogams* or lowest order of vegetation there are no flowers, spores take the place of true seeds, and as we descend the scale to mold, mildew, rust, and other microscopic fungi, the difficulty in distinguishing sex and the mode of reproduction correspondingly increases. The same difficulty, it may be observed, exists in the case of *Infusoria* and of *Zoophytes* in general.

In the *Phænogams* the flower is the generative apparatus, since from it come the fruit and seeds. It consists of the calyx, corolla, stamens, and pistil. The latter two are the sexual organs of the plant, and round them are the calyx and corolla which are termed the floral envelopes. The calyx is the external leafy covering, usually green, and divided into segments or sepals, like the fingers of a hand. Grasped in these sepals is the corolla, brilliant with colour and surrounding all the inner parts like a veil.

Within the beautiful corolla, and extending from base to apex of it are several slender filaments or stamens, bearing upon their extremities the male organs or anthers, which are mitre-shaped and consist of two small membranous sacs that contain the pollen or fertilising dust. The pistil, or female organ of fructification, is the most central of all, and is made up of three parts,—(1) the ovary, which lies at the base and contains the ovules or rudimentary germs; (2) the style, or filamentous part, which is not so essential as the others, and is sometimes wanting, as in the pine; and (3) the stigma, or head of the pistil, which is cloven, vascular, destitute of epidermis, and, formed as it is of the everted inner surface of the pistil itself, is thus the analogue of the vagina in animals.

The process of generation is simple. The anthers, when mature, open their valves and discharge the pollen upon the stigma, the papillary or hair-like cells of which are ready to retain it; the pollen penetrates downward through the loose tissue of the style, when such exists, and finally reaches the ovary where, coming in contact with the ovules, an embryo is produced that ultimately ripens into a perfect seed, the parent of a new plant similar to the old one.

It is this sexual structure and function of a plant, simple and well-known as it is, that forms the groundwork for the myth which introduces Pandora and Epimetheus. It comes in quick succession to the Mekonian era when Zeus saw, as in a glass darkly, the phantoms rising from the mists of time, and was so little pleased with what he saw that he preferred an independent existence, such as he had, to any combination with Prometheus leading up to disobedience mad and to woes innumerable for life.

And yet, resumes Hesiod, this same Life was eventually enticed by the soothing ways of Mind to enter into partnership. When? While later poets bring Helios into the myth and thus limit the date either to the Fourth Genesiac Day with a higher order of plant life, or to the Fifth Day with animal life, Hesiod makes no mention of the sun, and shows plainly by his narrative that mind and life were

first associated with vegetable forms, and almost from the beginning—that is, from the Third Scriptural Day when “The earth brought forth grass and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind.”

What form or mode of existence Life had previous to his union with Mind is not known,—there must have been many such between the abstract and the phenomenal,—but when the compact *was* entered into, Life, whether pulsating on the earth or (as the poet suggests) high above (ὑψιβρεμέτην) as a germinal revolving mass, must have been doubly vivified, stung to the inmost recesses of his being, and roused to new activity by the advent of an intelligent partner.

And when the new firm of Life, Mind, and Co.—this last being a personage useful only in name, and changed from time to time as business interests demanded,—came into being, there must have appeared a Protophyte with as much right and title to “the lord of creation” as his antitype Adam had in after ages. Why not? He looked around this new world of earth, and all that he saw was nought but water, clay, and air. In him alone were life and mind. He was Zeus; he was Prometheus; he was the first of mortals. For him mortality had as yet no sinister meaning, and his vegetative soul sent up an appropriate anthem to the Maker. It was a joyful song; but still there was a minor note of sorrow running through it, for the solitude was hard to bear. In creation’s span there was no helpmate fit for the Protophyte, and he wished for one. The wish was granted; and then appeared in the world’s mart the first of female kind, the close resemblance of the Kronos-born Protophyte in all save sex, the Pandora of her class, and his own particular Eve, who shared his life and occupied his thoughts to the exclusion of other subjects.

The original myth runs thus :

ἀλλά μιν ἐξαπάτησεν εὖς παῖς Ἰαπετοῖο,
κλέψας ἀκαμάτοιο πυρὸς τηλέσκοπον αὐγὴν

- ἐν κοίλῳ νάρθηκι· δάκεν δέ ἐ νειόθι θυμόν,
 Ζῆν' ὑψιβρεμέτην, ἐχόλωσε δέ μιν φίλον ἦτορ,
 5 ὥς ἴδ' ἐν ἀνθρώποισι πυρὸς τηλέσκοπον ἀγῆν.
 αὐτίκα δ' ἀντὶ πυρὸς τεῦξεν κακὸν ἀνθρώποισι.
 γαίης γὰρ σύμπλασσε περικλυτὸς Ἀμφιγυήεις
 παρθένῳ αἰδοίῃ ἱκελὸν Κρονίδεω διὰ βουλᾶς.
 ζῶσε δέ καὶ κόσμησε θεὰ γλαυκῶπις Ἀθήνη
 10 ἀργυφῆν ἐσθῆτι. κατακρήθην δὲ καλύπτρην,
 δαιδαλέην, χεῖρεσσι κατέσχεθε, θαῦμα ἰδέσθαι·
 ἀμφὶ δέ οἱ στεφάνους, νεοθηλέας ἄνθεσι ποίης,
 ἱμερτοῦς τ' ἐπέθηκε καρήατι Παλλὰς Ἀθήνη·
 ἀμφὶ δέ οἱ στεφάνην χρυσέην κεφαλῇφιν ἔθηκε,
 15 τὴν αὐτὸς ποίησε περικλυτὸς Ἀμφιγυήεις,
 ἀσκήσας παλάμῃσι, χαριζόμενος Διὶ πατρί.
 τῇ δ' ἐνὶ δαίδαλα πολλὰ τετεύχατο, θαῦμα ἰδέσθαι,
 κνώδαλ', ὅσ' ἥπειρος πολλὰ τρέφει ἡδὲ θάλασσα-
 τῶν ὅγε πόλλ' ἐνέθηκε, (χάρις δ' ἀπελάμπετο πολλή),
 20 θαυμάσια, ζώουσιν εἰκότα φωνήεσσιν.
 Αὐτὰρ ἐπειδὴ τεῦξε καλὸν κακὸν ἀντ' ἀγαθοῖο,
 ἐξάγαγ' ἔνθα περ ἄλλοι ἔσαν θεοὶ ἡδ' ἀνθρώποι
 κόσμῳ ἀγαλλομένην γλαυκῶπιδος ὀβριμοπάτρης.
 θαῦμα δ' ἔχ' ἀθανάτους τε θεοὺς θνητοῦς τ' ἀνθρώπους,
 25 ὥς εἶδον δόλον αἰπύν, ἀμήχανον ἀνθρώποισιν.—Theog. 565-589.

But this, Iapet's clever son disguised,
 Who hid instinctive fire's far-seeing light
 Within a hollow narthex. To the quick
 In soul it stung him, high-pulsating Zeus ;
 And pain spasmodic racked his inmost core
 When fire's far-seeing light in men he knew.
 Then he with expedition swift prepared
 An ill for men, a rival of the fire :
 For at his wish the far-famed demiurge
 Moulded of clay, with maiden grace attached,
 A close resemblance of the Kronos-born.
 Then did Minerva, bright-eyed goddess, gird
 And deck her with a garment finest spun :
 Grasped in her hands she held a wondrous veil
 Checkered with colours, circumambient :
 Around her too Pallas Minerva placed
 Crowns newly budding with the summer's bloom,
 All yearning for her head with sweet desire ;
 And round her placed for head a circlet rare
 Formed by the far-famed demiurge himself,
 And moulded palmate, father Zeus to please.
 In her own self had ovules strange been made,
 Wondrous to see, innumerable as
 The earth's expanse and ocean wide support.

Many of these he also stored away,
Wondrous, befitting life endowed with sound,
And from them grace in goodly measure beamed.

But when this beauteous ill-for-good he framed,
Then to the world where others, gods and men,
Abode, he led this prided in of her,
The bright-eyed daughter of a mighty sire ;
And mortals frail, and gods immortal too
Were seized with wonder, gazing on the lure
Enchanting, irresistible to men.

NOTES.

- 1 ἀλλά.—The ἀλλά shows that something different from what was said before is now introduced.

μν.—The *strength* of intelligential fire (πυρὸς μένος ἀκαμάτοις), already alluded to, was so disguised as to be suitable for nature's simplest animated kingdom, the vegetable.

- 5 ἐν ἀνθρώποισι.—That is, when life first felt in its vegetable being the intelligential fire, (even though disguised or weakened), that men were to possess in full.

- 6 ἀντὶ “opposed to, rivaling.”

- 7 γαίης σύμπλασσε.—“And the earth brought forth grass.”

Gen. i. 12.

Ἄμφιγυής.—Homer describes Vulcan as lame from birth ; other writers ascribe this lameness to his having been hurled from heaven by Zeus. The epithet Ἄμφιγυής, (ἀμφι γυίος), “doubly lame, or lame in both feet,” applied to him in consequence is simply indicative of the fact that incandescence for earth was born with the germs of decay, and that the innate light and heat of our orb are crippled in comparison with what they once were.

It is only as an *epithet*, however, that the term is used for Vulcan. The true Ἄμφιγυής has a birth anterior to the crippled son of Zeus, or to Zeus himself, and must be considered as synonymous with the mythological Æther,—with that “Essence in the Cosmos,” “ethereal fire of flame,” “Fire,” or primeval Light, alluded to so often in the Greek philosophies as that from which all the members of the phenomenal world are derived. The derivation, ἀμφι γυίων, “all-limbed, membered all around,” supports this interpretation ; so also does the Latin equivalent, *Mulciber*, which signifies “the director of matter ;” (ὅλη κυβερνάω, the μ being euphonic) ; and so do such phrases as *mundi fabricator*, and *opifex rerum*, used by Ovid in his description of the formation of the universe, *Metamorphoses*, lines 57 and 79.

The Ἄμφιγυής bears to the Creator the same relation that the *opus formationis* does to the *opus creationis*.

- 8 *Κρονίδεω*.—That is, the protophyte; for he was “born in time.”
 9 *Ἀθήνη*.—The plant, once moulded by the fabricator, is developed by Minerva or organic structure, who gives colour (*γλαυκῶπις*) to animated nature.

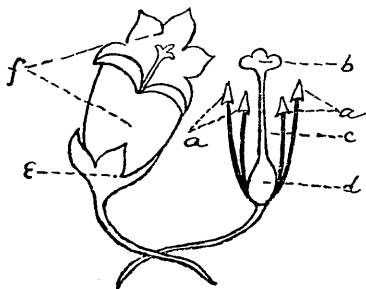
- 10 *ἀργυφύη* (*ἀργός ὑφαίνω*), “fine-spun.”

“Consider the lilies of the field how they grow; they toil not, neither do they spin; and yet I say unto you, that even Solomon in all his glory was not arrayed like one of these.”

Matt. vi. 28, 29.

κατακρήθεν.—The most important parts of the plant are now described, and may be compared with the cut, the portion to the right representing the male and female organs, that to the left, the floral envelopes.

καλύπτρην.—The corolla, grasped in the hands (*χείρεσσι*) or sepals of the calyx.



a, a. Stamens, with anthers. *b, c, d.* Pistil, with stigma (*b*), style (*c*), and ovary (*d*). *e.* Calyx, with sepals. *f.* Corolla.

- 12 *στεφάνους*. — The mitre-shaped anthers, swelling with pollen, and surrounding the head or stigma (*καρῆατι*) of the pistil.
 14 *στεφάνην*.—The stigma, which is club-shaped or palmate in appearance.
 17 *τῇ δ' ἐνὶ*.—In the ovary.
 18 *κνώδαλ'*.—The ovules; either from their being “motile and turgid” (*κινέω ὀιδαλέος*); or because they are the “well-known evidences” (*γνώ δηλώω*) of our origin.

In his Deucalion and Pyrrha, Ovid calls these ovules “documenta,” in the concluding line:

“Et documenta damus, qua simus origine nati.”

- 19 *τῶν πόλλ' ἐνέθηκε*.—The ovules of beasts, birds, and fishes, all of which were to appear in their own time.
 23 *ἀγαλλομένην*.—The female is the last and proudest effort of organic structure.

“O fairest of creation, last and best
 Of all God's works.”—*Milton*.

- 25 *δόλον αἰπύν*—

“For beauty is the bait which, with delight,
 Doth man allure, for to enlarge his kind;

Beauty, the burning lamp of heaven's light,
 Darting her beams into each feeble mind,
 Against whose power nor god nor man can find
 Defence."—*Spenser*.

As it was with the Protophyte, so was it with the first of every new species of plant and animal that appeared upon the earth. Since each one had a previous existence as a male being, and an after existence when he wished for and received the female of his kind, his history consisted in brief of a prologue and an epilogue, and he necessarily figured in it as a Prometheus and an Epimetheus. In the human being there was no exception to the great design, since man was formed first, the greatest Prometheus of them all ; nor to the general result, for then came woman.

It is in his "Works and Days" that Hesiod dwells upon the Epimethean phase of man's existence, and his description of creation's animated last is as terse and graphic as that of the first of female sex. He goes back to the point of leaving off—the first partnership between the two immortals.

Entangled as he was time and again in the meshes of Prometheus, Zeus avenged himself to the full. If Mind introduced him to a third party, Life accepted the new member and allowed him to participate in the general business for a time. In this way appeared the Protophyte and the Mushroom, the Calamite and *Lepidodendron*, the gigantic Fern, and many another of pith and moment in their day ; in this way too came the Protozoon and the Eozoon, the *Orthoceras* and *Trilobite*, the mailed *Pterichthys*, the *Pterodactyl*, *Dinotherium*, *Mastodon*, and countless others of high repute in the world's exchange.

But many-kindred as they were, and numerous as they were, and whether they ploughed the sea or drummed the land for a living, a day came for each when Life grew surfeited with affluence, irritated with the connection, and disturbed in spirit. As he could not sunder altogether the compact between himself and Mind, he revenged himself upon the third party, and retired the obnoxious individuals,

one after another, to the cold oblivion of the ocean's depths. With every geological subsidence were the flora and fauna of centuries destroyed; with every such cataclysm was the fire concealed,—not alone the intelligential fire of these animated beings, but also the central fire of our globe that was hidden more and more by the crust which the lifeless bodies of these beings helped in no small degree to thicken.

There came another day, however, when the heaven was blue and the sun shone bright and clear,—a Post-tertiary Day when Prometheus, stealing again the fire, or the last consignment of the fire, brought Zeus face to face with a new partner who called himself Man. Did Life expect him through the fulness of prefiguration? The Greek poet does not think so, for he says that man's advent was hidden from thunder-loving Zeus (*λαθὼν Δία τερπικέραυνον*), that is, from existing plants and animals with whose and for whose vital workings the rain clouds gather which bring on the thunder. Was man but an evolution of some pre-existent mammal? The poet again says "No;" for not from Life in any concrete form did man come, but from self-counselling, self-communing, or abstract life (*Διὸς πάρα μητιόεντος*)—and it is well to note that *μητιόεις* is but the adjective form of *μητις*, and that this is *μή τις*, "not something, not concrete, abstract."

Man came, and exhibited his independence from the first. He stared critically at Life from foot to head, and then, with much complacency, looked up beyond him. He measured himself with Mind, and found no difference. He took the well-worn ledger from the shelf and opened a new account. He cried out, "I am the measure of life, I am the measure of mind, I am the measure of all things. I am the firm; and being so ——." He left out his partners' names and wrote down "Man."

The immortalised ideals must have revolted at the slight, Zeus *μητιόεις* particularly so. Ousted as he was, abstract life may have had influence enough to point the looks at fowl and beast and to note the two of every kind,—

to institute fine distinctions between solitude and happiness, between enjoyment and content,—and to instil strange, elusive yearnings in this new lord and master.

“The world was sad!—the garden was a wild!
And man, the hermit, sighed!—till woman smiled!”

If so, life's promptings bore their fruit, and woman was made, the counterpart of Promethean man, the Eve of Epimethean Adam. Then did the epilogue begin which ended so fatefully for the human race.

With mind inferior to that of man alone, Eve was his superior in grace and beauty; so that in comparison with him she was the Zeus Olympian, the acme of visible life. She was Pandora, “the all-endowed;” she was Pandora, “the giver of all;” and among some of the things in her giving was the tempting apple.

Had the Epimethean Adam, says Hesiod in conclusion, but minded well the warning given to Promethean man, all would have been well. But he did not. He accepted a gift from this living acme, Eve; and only when he had eaten of the fruit and had experienced the miseries attendant on expulsion from the garden,—only then did he ponder!

ἀλλὰ Ζεὺς ἔκρυψε χολωσάμενος φρεσὶν ἧσιν,
ὅττι μιν ἐξαπάτησε Προμηθεὺς ἀγκυλομήτης·
τοῦνεκ' ἄρ' ἀνθρώποισιν ἐμήσατο κήδεα λυγρά.
κρύψε δὲ πῦρ· τὸ μὲν αὖτις εὖς παῖς Ἰαπετοῖο

5 ἔκλεψ' ἀνθρώποισι Διὸς πάρα μητιόεντος
ἐν κοῖλῳ νάρθηκι, λαθὼν Δία τερπικέραυνον.
τὸν δὲ χολωσάμενος προσέφη νεφεληγερέτα Ζεὺς·

Ἰαπετιονίδη, πάντων πέρι μῆδεα εἰδώς,
χαίρεις πῦρ κλέψας καὶ ἐμὰς φρένας ἡπεροπέυσας,
10 σοὶ τ' αὐτῷ μέγα πῆμα καὶ ἀνδράσιν ἐσσομένοισι·
τοῖς δ' ἐγὼ ἀντὶ πυρὸς δώσω κακὸν ὃ κεν ἅπαντες
τέρπωνται κατὰ θυμὸν ἐὼν κακὸν ἀμφαγαπῶντες.

ὣς ἔφατ'· ἐκ δ' ἐγέλασσε πατὴρ ἀνδρῶν τε θεῶν τε·
Ἥφαιστον δ' ἐκέλευσε περικλυτὸν ὅττι τάχιστα

15 γαῖαν ὕδει φύρειν, ἐν δ' ἀνθρώπου θέμεν αὐδὴν
καὶ σθένος, ἀθανάτοισι δὲ θεοῖς εἰς ὄπα εἴσκειν
παρθενικῆς καλὸν εἶδος, ἐπήρατον· αὐτὰρ Ἀθήνην
ἔργα διδασκῆσαι, πολυδαίδαλον ἱστὸν ὑφαίνειν·

- καὶ χάριν ἀμφιχέαι κεφαλῇ χρυσέην Ἀφροδίτην,
 20 καὶ πύθον ἀργαλέον καὶ γυιοβόρους μελεδῶνας·
 ἐν δὲ θέμεν κύνέον τε νόον καὶ ἐπίκλοπον ἦθος
 Ἑρμείαν ἥνωγε, διάκτορον Ἀργειφόντην.
 Ὡς ἔφαθ'· οἱ δ' ἐπίθοντο Διὶ Κρονίῳ ἀνακτι-
 αὔτικα δ' ἐκ γαίης πλάσσε κλυτὸς Ἀμφιγυήης
 25 παρθένῳ αἰδοίῃ ἵκελον Κρονίδεω διὰ βουλὰς·
 ζῶσε δὲ καὶ κόσμησε θεὰ γλαυκῶπις Ἀθήνη·
 ἀμφὶ δὲ οἱ Χάριτες τε θεαὶ καὶ πότνια Πειθῶ
 ὄρμους χρυσεῖους ἔθεσαν χροῖ· ἀμφὶ δὲ τήγχε
 ὦραι καλλίκομοι στέφον ἄνθεσιν εἰαρινοῖσι·
 30 πάντα δὲ οἱ χροῖ κόσμον ἐφήρμοσε Παλλὰς Ἀθήνη.
 ἐν δ' ἄρα οἱ στήθεσσι διάκτορος Ἀργειφόντης
 ψεύδεά θ' αἰμυλίου τε λόγους καὶ ἐπίκλοπον ἦθος
 τεύξε Διὸς βουλῇσι βαρυκτύπου· ἐν δ' ἄρα φωνῇ
 θῆκε θεῶν κήρυξ· ὀνόμνηε δὲ τήνδ' ἐγναῖκα
 35 Πανδώραν, ὅτι πάντες Ὀλύμπια δώματ' ἔχοντες
 δῶρον ἐδώρησαν, πῆμ' ἀνδράσιν ἀλφιστήσιν.
 Αἰτὰρ ἐπεὶ δόλον αἰπὺν ἀμήχανον ἐξετέλεσσαν,
 εἰς Ἑπιμηθεά πέμπε πατὴρ κλυτὸν Ἀργειφόντην
 δῶρον ἄγοντα, θεῶν ταχὺν ἄγγελον· οὐδ' Ἑπιμηθεὺς
 40 ἐφράσαθ', ὥς οἱ ἔειπε Προμηθεὺς μήποτε δῶρον
 δέξασθαι παρ Ζηνὸς Ὀλυμπίου, ἀλλ' ἀποπέμψειν
 ἐξοπίσω, μή πού τι κακὸν θνητοῖσι γένηται.
 αὐτὰρ ὁ δεξάμενος, ὅτε δὴ κακὸν εἶχ', ἐνόησε.

Works and Days, 47-89.

But Zeus, disturbed in spirit, covered o'er
 Whate'er Prometheus subtly lured him to ;
 And thus were dire disasters framed for men.
 He hid the fire ; once more from abstract Zeus,
 Unknown to thunder-loving Zeus, 'twas filched
 Within a hollow narthex for the race
 Of mankind by Iapet's noble son.

And thus did gloomy Zeus disturbed converse :

" O apt-born Mind who knows the plans of all,
 Thou'rt pleased in soul at having lured my thoughts,
 At having stolen fire, a mighty scourge
 For thine own self and men that are to come ;
 But I shall give them that which rivals fire,
 An ill with which, embracing each his own,
 All will be gladdened to their heart's desire."

Thus he ; and laughed the sire of gods and men.

Then did he prompt the fabricator famed ;
 " With water quickly mingle earth, and place
 Man's speech, man's energy therein, and shape
 A maiden's beauteous and beloved form,
 In visage like to the immortal gods ; "

Minerva too, "Teach her all useful works,
To deftly weave the many-coloured web ;"
The golden Venus, "Pour around her head
Grace in abundance, troubled tenderness,
And household cares relaxing to the limbs ;"
And Mercury, chief minister that slays
Simplicity, he prompted thus, "In her
Infuse a fitful mind and tricky way."

Thus he ; and they the Kronos-born obeyed.
The far-famed demiurge immediate framed
From earth the likeness of a bashful maid,
Conforming to the Kronos-born's desires ;
Bright-eyed Minerva robed and decked her out ;
The Graces fair and sweet Persuasion placed
A wealth of breastwork on her chest, both sides ;
The well-tressed Seasons circled her all round
With harvest rich and rare ; Minerva's all
Of ornament was moulded to her shape.
But in her breast, for boasting life's free-will,
The candour-slaying minister prepared
Pretexts, and wheedling words, and tricky way,
And in her, too, he placed no lack of speech.

This maid—a scourge for pleasure-seeking men,—
The herald of the gods Pandora called,
Because with gifts endowered she had been
By all that revel in Olympian homes.

But when this rare, this matchless piece of art
Was all complete, to Epimetheus then
The Father sent an envoy swift, divine,
Bearing as gift the candour-slayer famed :
Nor kept this Epimetheus well in mind,
As told him by Prometheus, ne'er to take
A present from Olympian Zeus, but back
To thrust it from him, lest perchance some ill
Should happen to the race of mortal men.
But when he took and suffered ill,—he thought !

NOTES.

- 3 *κήδεα λυγρά*.—The periodic destruction and subsidence of living forms throughout the ages was a presage of the Deluge for mankind.

- 20 *μελεδῶνας*.—"Women act their parts
When they do make their ordered houses know them."

Knowles.

- 21 κύνεδον.—Dogged, stubborn; and in a better sense, having conviction without proof, and adhering to it against reason.

“I have no other but a woman’s reason;
I think him so, because I think him so.”—*Shakspeare*.

“When a woman wills she will, you may depend on’t;
And when she won’t she won’t, so there’s an end on’t.”

- 22 Ἐρμείαν—(ῥέω) Change, variety, inconstancy.

“O woman, in our hours of ease,
Uncertain, coy, and hard to please,
And variable as the shade
By the light quivering aspen made.”—*Scott*.

Ἀργειφόντην.—A transposed form of ἀγρειφόντην (ἀγρείος φένω),
“the slayer of what is rural.”

Rural life has ever been considered typical of simplicity and innocence. Thomson apostrophises it thus:—

“Here too dwells simple truth; plain innocence;
Unsullied beauty; sound unbroken youth.”

What alters this happy mode of being? Change (Ἐρμείας), which is at once the herald (διάκρονον) and the slayer of simplicity (ἀγρειφόντην).

- 28 ὄρμους.—A haven, place of shelter or refuge; the breasts.

“On her bare breast, the heart of all her land.”—*Shakspeare*.

- 29 ἄνθεσιν εἰλινοῖσι.—

“A silver line, that from the brow to the crown,
And in the middle, parts the braided hair,
Just serves to show how delicate a soil
The golden harvest grows in.”—*Wordsworth*.

- 30 πάντα κόσμον.—“Is it for that such outward ornament
Was lavished on their sex?”—*Milton*.

- 33 φωνήν.—“A dearth of words a woman need not fear.”—*Young*.

- 34 θεῶν κῆρυξ.—We have altered the punctuation, and joined θεῶν κῆρυξ to ὀνόμηνε. Adam is meant, as being the herald of the gods, the fore-runner of immortal men.

“And Adam called his wife’s name, Eve, because she was the mother of all living.”—Genesis iii. 20.

35 πάντες Ὀλύμπια.—

“Adorned

With what all earth or heaven could bestow
To make her amiable.”—*Milton*.

38 Ἀργειφόντην.—That is, Eve, by whom primeval innocence was slain.

“But once beguiled—and ever more beguiling.”—*Byron*.

BOOK EIGHTH.

WRESTLING WITH THEIR FATE.

CHAPTER I.

MYTHS.

The Titanomachia.—When Zeus had waxed sufficiently in strength and years, and had been reinforced by those of his kin whom the potion, so skilfully prepared by Metis, compelled Kronos to disgorge, war was declared between him and the Titans for the sovereignty of the world. The latter were encamped on Othrys, Zeus and his forces on Olympus; and the combat lasted for ten years without any marked advantage for either side. At the end of this period Zeus, assisted materially by the Hecatoncheires and Cyclopes whom, owing to the advice of Gæa, he had delivered from Tartarus, obtained the victory after a most desperate struggle. Having plunged his enemies into Tartarus and set the Hecatoncheires over them as guard, he proceeded to reward his followers and allies with the spoils. Reserving Olympus for himself, he gave the empire of the sea to Neptune, and that of the infernal regions to Pluto.

The Gigantomachia.—Inflamed greatly by the punishment meted to her Titan offspring, Gæa next brought forth the Giants, begotten of the drops of blood that flowed from the wound inflicted by Kronos upon Uranus. These Giants are described as large in stature, irresistible in strength, and terrible in aspect. Their hair hung loose upon their shoulders, their beard was permitted to grow untouched, and their feet resembled those of dragons. They were born, according to some writers, in the Phlegræan plains, and according to others, in Pallene. Headed by Alcyoneus and Porphyrion, and armed with immense rocks and trunks of trees, they waged war on the immortals, and endeavoured, according to some accounts, to scale to heaven by piling

mountain upon mountain, Ossa upon Pelion, and Olympus upon Ossa. As there was a current rumour among the Gods that the Giants could not be conquered without the assistance of a mortal, Zeus summoned Hercules to aid him in the combat. The hero first attacked Alcioneus, and as this giant was immortal in his native land, Hercules, aided by Minerva, dragged him from Pallene and thus made an end of him. He then turned his attention to Porphyryon who, while struggling with Juno, was struck with lightning by Zeus, and then stretched low by the arrows of Hercules. In like manner did Apollo, Bacchus, Vulcan, Minerva, Neptune, and the other deities each engage a giant foe and destroy him with the help of Hercules.

The Typhomachia.—When Gæa felt that the Giants were being worsted by the Gods, she entered into close communion with Tartarus and begot the youngest and last of her children, Typhœus. Hesiod describes him as having immense hands, tireless feet, eyes that blazed forth fire, and a hundred heads like to those of a dragon, from which there issued fire and terrible voices of every conceivable description. Apollodorus says that Typhœus was born in Cilicia, and had the mingled nature of man and beast; that in size and bulk he overtopped the mountains, his head approached the stars, and so immense were his hands that one rested on the east and the other on the west of earth. His body was winged all over, he had a hundred dragon heads, his lower parts resembled those of a dragon, and from every head and every eye there darted fire. With terrible voices issuing from his heads, with surging waves of fire, and hurling upwards masses of red-hot rocks, he advanced towards Olympus and laid claim to absolute dominion. At his approach the Gods fled, as it is said, to Egypt, and metamorphosed themselves to animals, with the exception, as some aver, of Zeus and Minerva. After a most fearful contest, during which Zeus scourged the terrific being and blew off one head after another, the monster was finally overcome and buried under Mount Ætna.

CHAPTER II.

HEAT *VERSUS* LIFE.

The Battle of the Titans.—Assuming the granite to be the oldest of the rocks, we must then believe it to be the first compound formed, that is, the first matter rendered molar by molecular combination or attraction. This implies a previous time when compound matter was not, and when molecular matter was all-powerful.

If we deny the priority of granite, and believe that a crust existed previously, no traces of which have as yet been discovered, we only push back the existence of a compound body, and intensify the molecular existence of matter previous to this compound, since the further back we go the greater will be the heat, and heat is the all-essential agent in reducing matter to molecularity and keeping it so.

At whatever point, consequently, we date the inception of compound matter, there and then must we admit the potentiality of molecularity, and from that point believe that the struggle for superiority commenced between the two.

That matter is still in a molecular or vaporous condition in the central parts of our globe is believed by many geologists; that it was once universal and all-powerful when that globe was a molten ball of fire, is believed by all. It was for the covering or crust of our globe that the fight was waged between molecular and molar matter, and we are all cognisant of the result. A long one—millions of years—it was, and the duration of the battle was only equalled by the fierceness with which it was fought, by that exhibition of force requisite to combine and destroy the union of elements. How mighty was the force

on either side can be intelligibly grasped only by remembering that the energy displayed by the combination of hydrogen and oxygen into steam is equal to the impact of 22,320 tons falling from a height of one foot, and that the respective energies of steam condensing into water, and of water freezing into ice, are equal to the impact of 2,900 and 433 tons falling from a like distance.

Those are the combining or actual energies: we have but to reverse the process in order to know the decomposing or potential energies. "As potential energy disappears, actual energy comes into play; throughout the universe, the sum of these two energies is constant."

The combat was certainly an unequal one at the start, owing to the intense heat which disassociated the combining particles and repelled them from one another. But still the war went on in one shape or another, and the molecular Titans, strive as they might, could not altogether prevent the elements from differentiating one by one, nor from occasionally banding together on the confines for some fierce foray that invariably terminated in their quick dispersion and slaughter. And so it went on for ages, during all which the potential energy of the Titans ruled the world, and matter bowed the head to molecular being.

A day came at last when there was born of time that which was neither molar nor molecular, neither solid, liquid, nor gaseous, that which was not even an element and therefore was not matter, and that which, if a force, differs from all other forces when tested by the principle of correlation. Life was born, and Zeus threw in his lot with the weaker side and against the Titan crew. A formidable foe he proved, and feared from the beginning. The tradition had been handed down that he would rule the world; and Kronos, pledged by the Titans, had agreed to swallow him when born. A kindly earth and his own immaterial nature saved him from the maw that had already swallowed his material brothers and sisters, and so imperceptible were the beginnings of infant life upon our globe that it was suckled and guarded, strengthened

and fortified for many a day before the insolent Titans were even aware of his existence. When they did become cognisant of the fact, it was too late.

Life had waxed in years and in strength, had raised his head and seen that the broad domain of earth was one well worth contending for to the death; and so he boldly flung down the gauntlet and defied his foes. The challenge was accepted, and the Titanomachia began.

The molecular forces fought naturally from the standpoint of radiant heat, that is, from matter *sublimed* or brought to a state of vapour by heat and moving in *direct* lines—the *ὑψηλὴς Ὀθρυς* (*ὀρθός*) of the myth. Without a well-recognised leader, they trusted to their numbers, their ardour, to their impetuosity of motion, and direct charges.

The molar forces, on the other hand, contended from the visible combinations (Olympus, *οὐλος λάμπω*) of matter. While fewer in number, they too were equally resolute with their foes, were more united as a body, and had Life as leader, a host in himself, and a wary general that saw confusion in the numbers of the enemy, rashness in their ardour, the weakness of expansion in their motion, and who opened his lines to the direct charges and harassed his adversaries from flank and rear.

A host in himself we have said was Zeus, and the assertion is in no way hyperbolical. Man is an aggregate of molecules. Let us compute the population of to-day as 1,500,000,000, and the average weight of each individual as 80 lbs. Some fifty years ago this billion and a-half of people may be considered as existing in the germinal form, as capable consequently of being crowded into a cubic inch of space, and as weighing less probably than an ounce or two. Bit by bit, molecule by molecule, did they grow in size and weight, until now they occupy the land surface of the globe and have a gross weight of 60 millions of tons. What has done all this, what has abstracted this enormous molar mass from molecularity? Life. And yet this is but a small portion of what Life achieves in its own kingdom. Every beast, fowl, and fish, and every creeping

thing, commenced existence as a germ, and to-day they swarm in the fields, the air, the sea, the nooks and crannies of our earth, greater, far greater in number than the human race, and head for head outmeasuring the bulk and weight of individual man. Nor is this all; there is still the vegetable kingdom, each member of which also began its being as a germ or cell, and grew molecule by molecule; whose numbers are countless, and whose bulk in many cases outvies that of the most unwieldy dweller of the land and sea. To make an estimate of the molar mass of either animal or plant kingdom would be impossible, and were it capable of being done, the figures in billions,—trillions of tons, would but pain the eye and madden the comprehension. What, again we ask, has achieved all this? Life. In cell and germ has he planted his standard: they grow with his growth and strengthen with his strength. His presence is infused in every bone and muscle, trunk and bough, in every member, leaf, and rootlet, every nerve and vessel; his active energy pervades in part and whole, directing, guiding, and overseeing the humblest and the greatest of his subjects; through him do they exist and procreate, and through his counsels do they abstract molecule after molecule of carbon, hydrogen, oxygen, and nitrogen, of iron, lime, potash, phosphorus, of every known element in short, to combine into their own mass and prove to the world at large that the dynasty of the Titans is no more. What has happened recently and is happening to-day happened also in the past. The coral islands of the Pacific, the nummulitic strata of the Tertiary period, the hippuritic limestone and chalk of the Cretaceous, and the coal beds of the Carboniferous are evidences not alone of the profusion of living beings in their respective eras, but also of the inordinate amount of molecular matter which they abstracted from sea and air and land in order to form those rocky layers that are tens of hundreds, some of them tens of thousands of feet in thickness.

Hooker, citing carbonate of lime in sea-water as an instance of the processes of life, says, "Shell-animals

there gather it to make their shells, or coral animals to make their skeletons. This is a *vital* operation, for in the bodies of these animals, by a vital power, the carbonate of lime is separated from the water in which it is dissolved, and is deposited in a solid form. Then by a *mechanical* operation, these shells and skeletons become massed into solid rock." And elsewhere the same writer says, "A large portion of the crust of the earth is, in fact, the result of the aggregate labour of minute animals and vegetables."

But to go back to the days of Kronos. While Life was by no means the universal and potential being that he was later on and is to-day, he was still a force possessed of great capabilities, actively energetic, the one and only leader for the cohorts of combination to rally round, and a foeman worthy of being dreaded even from the beginning.

Hesiod, when writing of the great primal battle between the combining and the repelling forces, brings us back to the time when Life entered on his first campaign and impressed upon his followers the strong necessity of union if they hoped to win success. They followed his advice, even to the death, for thousands of them went down,—down towards the centre, as science tells us, after having become noted for their weight and influence and distinguished qualities upon the surface,—down towards the centre, as Hesiod tells us, when he says that Gæa "*did ever deposit all*" in the hope of sharing eventually in the prize when the grand distribution of land and sea and air would be brought about. And these were succeeded by thousands more who, after imitating the noble example of their predecessors while in life, followed them into the fiery furnace when they could fight no more. Thus it went on, the surface particles growing heavier in Olympus, and then sinking towards the centre, while the central particles, hotter and lighter, mounted from the ancient Othrys to the regions above. Such determined action on the part of Life's followers was productive from the first of notable consequences, for with this union or combination of matter there necessarily appeared Weight or Gravity, Shape or

diversity of form, and Division or that complex process which accompanies matter when evolving from the simple. Life had, in truth, brought back these Hecatoncheires; and Hesiod commences the Titanomachia by appropriately introducing them upon the scene.

Ὀβριάρῃ δ' ὥς πρῶτα πατὴρ ᾠδύσσατο θυμῷ
 Κόττω τ' ἠδὲ Γύη, δῆσε κρατερῷ ἐνὶ δέσμῳ,
 ἡγορέην ὑπέροπλον ἀγώμενος ἠδὲ καὶ εἶδος
 καὶ μέγεθος· κατένασσε δ' ὑπὸ χθονὸς εὐρυοδείης·
 ἔνθ' οἶγ' ἄλγε' ἔχοντες ὑπὸ χθονὶ ναιετάοντες
 εἶατ' ἐπ' ἐσχατιῇ, μεγάλης ἐν πείρασι γαίης,
 δηθὰ μάλ', ἀχνύμενοι, κραδίη μέγα πένθος ἔχοντες.
 ἀλλὰ σφεας Κρονίδης τε καὶ ἀθάνατοι θεοὶ ἄλλοι,
 οὓς τέκεν ἡΰκομος Ῥεῖα Κρόνου ἐν φιλότῃ,
 Γαίης φραδμοσύνησιν ἀνήγαγον ἐς φάος αὐτῆς·
 αὐτὴ γάρ σφιν ἅπαντα διηνεκέως κατέλεξε,
 σὺν κείνοις νίκην τε καὶ ἀγλαὴν εὖχος ἀρέσθαι.
 δηρὸν γὰρ μάρναντο, πόνον θυμαλγέ' ἔχοντες,
 Τιτῆνες τε θεοὶ καὶ ὅσοι Κρόνου ἐξεγένοντο,
 αὐτίον ἀλλήλοισι διὰ κρατερὰς ὑσμῖνας·
 οἱ μὲν ἀφ' ὑψηλῆς Ὀθρυὸς Τιτῆνες ἀγανοί,
 οἱ δ' ἄρ' ἀπ' Οὐλύμπιοι θεοί, δωτῆρες ἑάων,
 οὓς τέκεν ἡΰκομος Ῥεῖα Κρόνῳ εὐνηθείσα·
 οἳ ῥα τότε ἀλλήλοισι πόνον θυμαλγέ' ἔχοντες
 συνεχέως ἐμάχοντο δέκα πλείους ἑνιαυτούς.
 οὐδέ τις ἦν ξριδος χαλεπῆς λύσις οὐδὲ τελευτὴ
 οὐδετέρους, ἴσον δὲ τέλος τέτατο πτολέμοιο.—Theog. 617-638.

When first in spirit wrathful grew their sire
 With Gyes, Cottus, and Briareus,
 Struck by their overwhelming strength, their shape,
 Their size, he held them fast in durance vile
 And stamped them down beneath the wide-wayed earth.
 There, filled with pain, those subterraneous ones
 Lay on the verge in mighty earth's extremes,
 Long, long in anguish, and in heart distressed.
 But these did Zeus and other deathless gods
 Whom fair-haired Rhea, wife of Kronos, bore,
 Bring back to light through artful ways of Gê,
 Since she did e'er deposit all for them,
 To win with them and glory bright obtain.
 For long they fought, with toil and moil beset,
 And face to face throughout the conflicts dire,
 Those Titan gods and all from Kronos sprung;
 The Titans haught from Othrys the sublime,
 And from Olympus all the gods benign
 Whom fair-haired Rhea, wed to Kronos, bore.

And so, with toil and moil for both they fought
 Unceasing ever for ten periods full;
 Nor let nor stay from bitter strife was there
 For either, and war's tide rolled even on.

"For ten periods full," says the poet, did the fight between molecular and molar force continue, and fierce as it was, unceasing as it was, neither side could claim the victory at the close. Let us bear well in mind the different states of matter and the conditions on our globe at the time. In solids, the particles are so firmly held together by attraction that the bodies retain their figure and capability of division: in gases, the repulsive forces so predominate that the attractive force is overcome—and with it figure and divisibility,—and the particles are driven asunder.

Life, all the other Kronos-born, and the Hecatoncheires fought for the solid; the molecular Titans for the gaseous; and so intense was the heat on one side, and the desire for combination on the other, that neither solid nor gas could gain a marked advantage for many a long day. "Nor let, nor stay," to use the poet's words, there was from the bitter fight; and the tenth day, as he says, still saw them encamped against each other as hostile and apparently as vigorous as before. Supposing, as there is every reason for doing so, a period (*ἐνιαυτός*) to be equal in length of time to that of each Labour of Hercules, and the Tenth Labour (the carrying off of Geryon's oxen) to be synchronous with the Tertiary Period, then, according to Hesiod, the duration of the contest between the forces of early heat and of early life was as long as all the years that elapsed from the end of that contest up to the close of Tertiary time. This, by the way, is curiously in unison with Hitchcock's supposition that the period occupied by earth in changing from a molten surface to a solid one was longer than all Palæozoic, Mesozoic, and Cainozoic time put together.

The poet resumes his narrative by taking advantage of a poet's license. On or about the close of the tenth cycle, Life summons all his followers in high conclave. While

the nectar flows, he reminds the Hecatoncheires how, through means of his, they had been called back from the enfeebled state in which they had been held confined in gaseous matter, and while bidding them to stretch forth for a final effort the arms, as irresistible as they are imperceptible, of attraction, shape, and divisibility, he at the same time admonishes them to be ever mindful of the interests of solidity. He is answered, not by Attraction, not by Figure,—it made but little difference to the latter and less to the former, whether life ruled or not over the molar masses,—but by Cottus, whose prophetic instinct warned him of the cold that was to come for earth in ages yet unborn,—cold, the deadly foe of germination, budding, procreation, decay, of the myriad complex or dividing processes for which Cottus stands. The Hecatoncheir dreaded “the chilly curse,” and knowing that *vital* force was the one and only protection against it, he promises for himself and brethren to safeguard the domain of life by throwing it into vast foldings or plications.

ἀλλ' ὅτε δὴ κείνοισι παρέσχεθεν ἄρματα πάντα,
νέκταρ τ' ἀμβροσίη τε, τάπερ θεοὶ αὐτοὶ ἔδουσι,
πάντων τ' ἐν στήθεσσιν ἀέξετο θυμὸς ἀγήνωρ,
ὥς νέκταρ δ' ἐπάσαντο καὶ ἀμβροσίην ἐρατεινήν,
δὴ τότε τοῖς μετέειπε πατὴρ ἀνδρῶν τε θεῶν τε·

Κέκλυτέ μευ, Γαίης τε καὶ Οὐρανοῦ ἀγλαὰ τέκνα,
ᾧφρ' εἴπω τά με θυμὸς ἐνὶ στήθεσσι κελεύει.
ἤδη γὰρ μάλα δηρὸν ἐναντίοι ἀλλήλοισι
νίκης καὶ κράτεος πέρι μαρνάμεθ' ἥματα πάντα
Τιτῆνές, τε θεοὶ καὶ ὅσοι Κρόνου ἐκγενόμεσθα.
ὕμεις δὲ μεγάλην τε βίην καὶ χεῖρας ἀάπτους
φαίνετε Τιτῆνεσσιν ἐναντίοι ἐν δαὶ λυγρῇ,
μνησάμενοι φιλότῃτος ἐνηέος, ὅσσα παθόντες
ἐς φάος ἄψ' ἀφίκεσθε, δυσηλεγέος ἀπὸ δεσμοῦ,
ἡμετέρας διὰ βουλὰς ὑπὸ ζόφου ἡερόεντος.

ᾧς φάτο· τὸν δ' ἐξαὔτις ἀμείβετο Κόττος ἀμύμων·
δαιμόνι, οὐκ ἀδάητα πιφαύκεαι· ἀλλὰ καὶ αὐτοὶ
ἴδμεν, ὅ τοι περὶ μὲν πραπίδες, περὶ δ' ἐστὶ νόημα,
ἀλκτὴρ δ' ἀθανάτοισιν ἀρῆς γένεο κρυεροῖο.
ἄψορρον δ' ἐξαὔτις, ἀμειλίκτων ἀπὸ δεσμῶν,
σῆσιν ἐπιφροσύνησιν ὑπὸ ζόφου ἡερόεντος
ἡλύθομεν, Κρόνου ὕιε ἀναξ, ἀνάελπτα παθόντες.

τῷ καὶ νῦν ἀπενεῖ τε νόφ καὶ ἐπίφρονι βουλῇ
 ῥυσόμεθα κράτος ὑμὸν ἐν αἰνῇ δηϊότητι,
 μαρνάμενοι Τυτῆσιν ἀνὰ κρατερὰς ὑσμίνας.
 ὦς φάτ'· ἐπήνησαν δὲ θεοί, δωτῆρες ἑάων,
 μύθον ἀκούσαντες· πολέμου δ' ἐλιλαίετο θυμὸς
 μᾶλλον ἔτ' ἢ τοπάρουιδε.—Theog. 639-666.

When now before them lay refreshments spread,
 Ambrosia, nectar, such as gods consume,
 When spirit plainly swelled in breasts of all
 While nectar and divine ambrosia passed,
 Then thus harangued the sire of gods and men :
 " Give heed, great race of Uranus and Gē,
 That I may speak the urgings of my mind.
 For long, exceeding long, and front to front,
 Have we, the Titan gods and Kronos-born,
 Waged war each day for victory and rule.
 Your strength and hands impalpable now show
 In conflict dread against the Titan host,
 Giving due heed to kindly union, and
 How back to light through plans of ours ye came,
 Ye that had suffered, suffered much and long
 From galling bondage 'neath the misty gloom."
 Thus he ; and complex Cottus answered back :
 " With words of wisdom hast thou spoken, lord ;
 But we too know, in sooth, what there's in store
 For vitals and for mind, and that thou'rt born
 A warder of the chilly curse from gods.
 And we, O king, O thou from Kronos sprung,
 We, who have suffered almost hopeless 'neath
 The misty darkness, have at thy behests
 Come back once more from bondage without stint.
 So now with mind intent and duteous wish,
 Fighting with Titans through the conflicts dire,
 Shall we in war's dread tug infold thy might."
 He spoke ; the gods, the givers of all good,
 Hearing his speech applauded to the full ;
 And more than ever raged the thirst for war.

The day approached that witnessed the final struggle
 between heat and life for absolute dominion.

Whatever obscurity there may be as to the time when
 the Titanomachia commenced, there appears to be very
 little, if any, as to that of its termination. In the first
 place it will be remembered that Hesiod, in his building
 of our earth, goes no further than the granite (Echidna)

and the schistose rocks (Asteria). All his personages and incidents lead up to these, and these presumably to the battle itself. In the next place, there are many words and phrases (to be noticed further on), in the concluding part of his description that point indubitably to those same schistose rocks, and to the notable characteristics of *plication*, *schistous division*, and *inclination* impressed upon them.

Again, what are the main characteristics of the contest ?

1. A struggle that lasted for unknown ages between the forces of heat and those of life, without advantage to either side.
2. A final and tremendous conflict between the two at the close of the tenth cycle, in which land, sea, and air were alike involved, and in which fire, scorching heat, earthquakes, chemical explosions, thunder, lightning, and the great physical forces of nature played so prominent a part.
3. The triumph of life or Zeus.
4. The hurling of the Titans into Tartarus.

In the geological record there is no period but one that will suit these characteristics. The purely sedimentary rocks are derived from the ruins of the preceding, show an originally tranquil deposition, are unaltered in texture, bear no impress of scorching heat or of disturbance outside of what upheaval, volcanic energy, and localised plutonic action would cause, and are equally rich in fossils differing not so much in profusion as they do in evolution.

But underneath the oldest of those sedimentary strata there lies a mixed mass of granite, and of gneiss and other schists, computed to be 30,000 feet or more in thickness, whose base has never been discovered, and all of which are classed as Archæan rocks. There is much that is vague as to their origin, but their crystalline structure, the welding of their particles and laminae, their crumpled and vertical bedding and vast plications denote intense internal and external disturbance, and stamp them with the marks of fire and heat. Furthermore, no fossils have been dis-

covered in them. They may have existed—it is the strong opinion that they did exist—fewer in number probably, and simpler in nature it is to be supposed ; but if so, all vestiges of their remains, the possible Eozoon excluded, have been destroyed by fire, heat, and other agencies. Fire and heat are as conspicuous in those hypogene rocks as life is in those above them. Since the stratified nature of the gneiss and other metamorphic rocks denotes an originally quiet and horizontal deposition on their part equally with the sedimentary pile above them, the altered, convulsed, and non - fossiliferous appearance of these Archæan rocks leads geologists to conclude—

1. That their crystalline structure was a subsequent process that went on for an indefinite length of time, during all of which the heat was so intense that life must have had a hard struggle for existence.
2. That the close of the Archæan age was witness to the occurrence among the Archæan rocks of one of the most fearful convulsions that ever wrecked our earth since a crust was established upon it.
3. That the end of the struggle was a complete triumph for life, since we find the Silurian rocks, that succeed and rest upon the Archæan, graced by the presence in profusion of Protozoans, Radiates, Mollusks, and Articulates,—that is, by every division of the animal kingdom, the Vertebrates alone excepted.
4. That the melting and re-cementing of the schistose rocks formed a more stable crust for our globe, and served essentially to confine the fire and heat within the depths below.

If we compare these geological outlines with the mythological ones, we are struck by the close correspondence between the two, and may reasonably infer that the Titanomachia is synchronous with the close of the Archæan age, and that the celebrated battle of the Gods and Titans is a vivid picture of what may well be supposed to have occurred at a period when our earth was so mysteriously and so terribly convulsed—

μάχην δ' ἀμέγαρτον ἔγειραν
 πάντες, θήλειαί τε καὶ ἄρσενες, ἥματι κείνῳ,
 Τιτῆνες τε θεοὶ καὶ ὅσοι Κρόνου ἐξεγένοντο,
 οὓς τε Ζεὺς Ἐρέβεσφιν ὑπὸ χθονὸς ἦκε φώσδε,
 δεινοὶ τε κρατεροὶ τε, βίην ὑπέροπλον ἔχοντες.
 τῶν ἑκατὸν μὲν χεῖρες ἀπ' ὧμων αἰτσοῦντο
 πᾶσιν ὁμῶς, κεφαλὰὶ δὲ ἐκάστω πευτήκοντα
 ἐξ ὧμων ἐπέφυκον ἐπὶ στιβαροῖσι μέλεσσιν.
 οἱ τότε Τιτῆνεςσι κατέσταθεν ἐν δαὶ λυγρῇ,
 πέτρας ἡλιβάτους στιβαρῆς ἐν χερσὶν ἔχοντες.
 Τιτῆνες δ' ἐτέρωθεν ἐκαρτύναντο φάλαγγας
 προφρονέως, χειρῶν τε βίης θ' ἅμα ἔργον ἔφαινον
 ἀμφοτέρω. —Theog. 666-678.

Then on that day unenviable strife
 Was roused by all, by male and female like,
 By Titan gods, by all from Kronos sprung,
 And by those likewise, wondrous strange and strong,
 With overwhelming force, whom Zeus brought back
 From evolution under earth to light :
 'Way from whose shoulders hundred hands there flashed
 Alike for all ; from fifty shoulders grew
 Anent the well-squared members heads for each :
 These faced the Titans then in deadly strife,
 With well-squared hands that grasped the massy rocks.
 The Titans, on their side, with forward soul
 Their columns reinforced ; quick showed the two
 The work of hands, and that of simple force.

The rocks themselves bear testimony to the fierceness of the Archæan battle. Whole strata, miles in extent, have been crumpled and folded as if they were but so many sheets of paper ; they have been raised from the horizontal position and inclined at every angle, even to the perpendicular ; their laminæ and smallest particles are shown microscopically to have been sharers in the fight, for they too are welded, as it were, into each other and exhibit the same contortions, crumpling, and intense plication that the larger masses do. "Imagination," says M'Culloch, when writing of those rocks as observed in Scotland, "can scarcely conceive an intricacy of flexure of which a resemblance could not be found in the gneiss."

"The nucleus of the whole group," writes Anderson of the Grampian Hills, "is granite, one dense aggregation

of crystals, now rent and furrowed by a thousand seams, the heart and penetralia bared and open, a convulsed sea of molten matter still and motionless as the grave! The associated rocks, all of the primary class, are gneiss, mica-slate, quartz-rock, chlorite-slate, and limestone; and these enclose no relic of a living thing."

Their very constituents, the quartz, mica, and feldspar are inextricably laced, and the micaceous folia curl and twist in a manner scarcely to be distinguished from that of the fluid structure of obsidian or any other purely igneous rock.

All this denotes a previous state of great flexibility, if not of thorough fusion, when the particles and masses were free to move and enter into new combination; all this denotes mighty forces and a mighty conflict, such as could change miles of rock from the horizontal to the perpendicular, and squeeze them together as we would a newspaper. Land, sea, and air, fire, heat, steam, pressure, even electricity, all appear to have participated in the geological struggle. Water, crystals of common salt, and liquid carbonic acid have been observed in the minute cavities of the crystalline particles; and the joints have been ascribed to electric influence. So that to the horrors of a land wrecked with eruptions of molten matter and convulsed with the quakings of a fragile crust, we must add the additional horrors, as described by Hugh Miller, of a sea "boiling as a pot," of an atmosphere intensely hot, reeking with vapour, surcharged with carbonic acid gas, wrapped "in a darkness gross and palpable as that of Egypt of old,"—a darkness rendered all the more terrible by the roaring wind, the sheeted rain, the rending lightning, and the all-shaking thunder.

"Who," says Figuier, "would dare to paint the horrors of these first and mysterious convulsions of the globe?" Only one that we know of,—Hesiod; and if mere words are capable of bringing the scene before the mind's eye, then the poet has done it, and done it well. Even in bald English the description is imposing and realistic: how much more so in the original. In a whirl of words vivid

with imagery, and teeming with onomatopœia, are we carried from the ominous sounds of ocean to the general collapse ; then, to the warring lightning, universal quaking and general conflagration, till nought remains of solid matter but crackling dust wherein the constituents, quartz, feldspar, mica, &c., still carry on the struggle. One step further and, as the poet suggests, matter would be reduced to the simple and unknown that it was originally in Chaos ! Then do the multiple hands of Attraction, Figure, and Divisibility come into play and act upon the elements : the first binds them fast into rocky masses, shape gives them their various outlines interiorly and exteriorly, and the complex Cottus separates the whole into the gneiss, the talc, mica, hornblende, chlorite, and other schists. Then too ensue those various mysterious processes, the vast swelling or plication (ὄτοβος), the schistous structure (κάρτος), and inclination from the horizontal (ἐκκλίωθη), that mark the Metamorphic rocks and make them what they are, the overshadowing prison of central fire and heat, and the progenitors of the Cambrian and other strata that openly testify to the sway of Life.

δεινὸν δὲ περίαχε πόντος ἀπείρων,
γῇ δὲ μέγ' ἐσμαράγησεν, ἐπέστενε δ' οὐρανὸς εὐρύς
σειόμενος, πεδόθεν δ' ἐτινάσσετο μακρὸς Ὀλύμπος
ρίπη ὑπ' ἀθανάτων, ἔνοσις δ' ἵκανε βαρεῖα
Τάρταρον ἡερόεντα, ποδῶν τ' αἰπεία ἰωή
ἀσπέτου ἰωχμοῖο βολᾶων τε κρατερᾶων·
ὥς ἄρ' ἐπ' ἀλλήλοις ἴεσαν βέλεα στονόεντα.
φωνή δ' ἀμφοτέρων ἵκετ' οὐρανὸν ἀστερόεντα
κεκλομένων· οἱ δὲ ξύνισαν μεγάλῳ ἀλαλητῷ.
οὐδ' ἄρ' ἔτι Ζεὺς ἴσχευεν ἔδον μένος ἀλλὰ νῦ τοῦγε
εἴθαρ μὲν μένεος πληντο φρένες, ἐκ δέ τε πᾶσαν
φαῖνε βίην· ἄμυδις δ' ἄρ' ἀπ' οὐρανοῦ ἡδ' ἀπ' Ὀλύμπου
ἀστράπτων ἔστειχε συνωχᾶδόν· οἱ δὲ κεραυνοὶ
ἵκταρ ἅμα βροντῇ τε καὶ ἀστεροπῇ ποτέοντο
χειρὸς ἄπο·στιβαρῆς, ἱερὴν φλόγα εἰλυφόωντες,
ταρφέες· ἀμφὶ δὲ γαῖα φερέσβιος ἐσμαράγιζεν
καιομένη, λάκε δ' ἀμφὶ πυρὶ μεγάλ' ἄσπετος ὕλη.
ἔζεε δὲ χθὼν πᾶσα καὶ Ὠκεανοῖο ῥέεθρα,
πόντος τ' ἀτρύγετος· τοὺς δ' ἄμφεπε θερμὸς αὐτμῇ
Τιτῆνας χθονίους, φλόξ δ' ἡέρα διὰν ἵκανε

ἄσπετος, ὅσσε δ' ἄμερδε καὶ ἰφθίμων περ ἐόντων
 αὐγὴ μαρμαίρουσα κερανοῦ τε στεροπῆς τε.
 καὶμα δὲ θεσπέσιον κάτεχεν Χάος· εἴσατο δ' ἄντα
 ὀφθαλμοῖσιν ἰδεῖν ἢ δ' οὐασιν ὅσσαν ἀκοῦσαι
 αὐτως, ὥς ὅτε Γαῖα καὶ Οὐρανὸς εὐρύς ὑπερβεν
 πύλαινθ'. οἷος γάρ κε μέγιστος δοῦπος ὀρώροι
 τῆς μὲν ἐρειπομένης, τοῦ δ' ὑψόθεν ἐξεριπόντος,
 τόσσος δοῦπος ἔγεντο θεῶν ἔριδι ξυνιώντων.
 σὺν δ' ἄνεμοί τ' ἔνοσίς τε κοινὴν ἐσφαράγιζον
 βροντὴν τε στεροπὴν τε καὶ αἰθαλόεντα κεραυνόν,
 κῆλα Διὸς μέγалоιο, φέρον δ' ἰαχὴν τ' ἐνοπὴν τε
 ἐς μέσον ἀμφοτέρων, ὅτοβος δ' ἀπλητος ὀρώρει
 σμερδαλέης ἔριδος, κάρτος δ' ἀνεφαίνετο ἔργων,
 ἐκλίνθη δὲ μάχη· πρὶν δ' ἀλλήλοισι ἐπέχοντες
 ἐμμενέως ἐμάχοντο διὰ κρατερὰς ὑσμίνας.
 οἱ δ' ἄρ' ἐνὶ πρώτοισι μάχην δριμεῖαν ἔγειραν
 Κόττος τε βριάρεώς τε Γύης τ' ἄατος πολέμοιο,
 οἳ ῥα τριηκοσίας πέτρας στιβαρῶν ἀπὸ χειρῶν
 πέμπον ἐπασσυτέρας, κατὰ δ' ἐσκίασαν βελέεσσι
 Τιτῆνας, καὶ τοὺς μὲν ὑπὸ χθονὸς εὐρυοδείης
 πέμψαν καὶ δεσμοῖσιν ἐν ἀργαλέοισιν ἔδησαν,
 νικήσαντες χερσὶν ὑπερθύμους περ ἐόντας,
 τόσσον ἔνερθ' ὑπὸ γῆς, ὅσον οὐρανὸς ἐστ' ἀπὸ γαίης.

Theog. 678-720.

Then dreadful boomed the boundless sea ; the earth
 Rumbled throughout ; wide heaven convulsive moaned ;
 Olympus broad shook to its very plinth
 Under the rushing of immortal gods ;
 And to dark Hades reached the throes of earth,
 The hollow ring of its foundations, and
 Of wildering echo of the mighty shocks.
 Thus then on each fell fast the scathing blows.
 The sound of both, urging their fellows on,
 Reached the starred canopy of heaven ; and then
 With cry terrific they encountering closed.
 No longer Zeus restrained his strength, but straight
 His vitals now with energy were filled,
 And all his force flashed forth : ceaseless he ranged
 Lighting Olympus and the heaven alike ;
 Quick with the thunder and the lightning flew
 From massive hands of his the dreaded bolts
 That whirled and interlinked the sacred fire ;
 The burning, foodful globe on all sides quaked ;
 And matter cracked beyond compare with fire.
 Then steamed the all of earth, the ocean's springs,
 The boiling sea ; then circling round and round
 Those earthy Titans coursed the fiery surge ;

Then flame untold to air celestial came ;
And mighty though they were, the dazzling glare
Of bolt and lightning 'reft them of their sight.
Then awful Chaos checked the heat intense,
And seemed as face to face with eyes to see,
With ears to hear a boding sound,—the same
As once when heaven above and earth drew nigh :
For such a crash tremendous as arose
From him compressing and from her compressed,
Some such the crash was of conflicting gods.
Then in the thick of both the blasts and throes
Crackled the dust with loud explosion, yea,
The very weapons of great Zeus himself,
The thunder, lightning, and the blazing bolt
That brings the bitter cry and shrieking wail.
Immense the swell of dread compression rose ;
The schistous structure of the works appeared ;
And sloping upward grew the field of fight.
But previous, grappling with each other they
Commingled fought throughout the conflicts dire.
Then in the elements was piercing strife
Roused up by Cottus, by Briareus,
By Gyes too, insatiate for war :
For thick and fast from well-squared hands they sent
Rocks full three-hundred ; winning by their hands,
They gloomed the Titans, haughty as they were,
With missiles such ; bound them in irksome bonds ;
And plunged them under widely-fissured earth,—
As far 'neath earth as earth is from the heaven.

CHAPTER III.

THE TRAP ROCKS *VERSUS* LIFE.

The Battle of the Giants.—The conquest of those Archæan Titans may well be said to have established the sway of Zeus, for from the beginning of Palæozoic time there is no break in the record of life upon our globe. If deficient or absent in one locality, it is present and abundant in another, and, as plant or animal or both, has ruled formation after formation according as they came into being. As Hesiod says—

Αὐτὰρ ἐπεὶ ῥα πόνον μάκαρες θεοὶ ἐξετέλεσσαν,
 Τιτήνεσσι δὲ τιμάτων κρίναντο βίηφι,
 δῆ ῥα τότε ὄτρυνον βασιλευμένῃ δὲ ἀνάσσειν
 Γαίης φραδμοσύνησιν Ὀλύμπιον εὐρύσπα Ζῆν
 ἀθανάτων· ὃ δὲ τοῖσιν ἐν διεδάσσατο τιμάς.—Theog. 881-885.

But when their task the gods had gladly wrought
 And bravely stripped the Titans of the bays,
 Forthwith, through cunning ways of Gē, they urged
 Zeus, the Olympian and far-seeing Zeus,
 To wield the sceptre and immortals rule;
 And well has he the prizes 'mongst them shared.

To Neptune was the watery domain allotted; and to Pluto, Hades or the all-unseen of earth; Juno got the continental and insular areas; Minerva, the organisation of the living kingdoms; Venus, the affinity that attracts and binds all things: Apollo and Diana were given the influences of the atmosphere over light, heat, and sound; Mars chose battle for his share, and the Life that was compelled to mete it out gave it with a frown and a rooted dislike for the recipient; Bacchus took liberty; Vulcan, fire; and so on, not one being forgotten or overlooked, not even those who, like Styx and Hecate, came over to the winning side. But Zeus himself, while retaining the clear Olympus for his peculiar abode, was the lord paramount

of all, and manfully has he maintained the title from that day to this.

Life's troubles, however, did not end with the overthrow, or rather underthrow of the Titans. Scarcely had it recovered from the moil and toil of the great Metamorphic battle, when it had once more to take the field, and this time against the bold intrusions of what we call *igneous* rocks, and the Mythologists called *Giants*. The difference is but a seeming one to the eye, for the Latin *ignis* and *gigas* are equally related to γίγναι, the initial γ in the one, and the ν in the other, being omitted ; and both are confessedly "earth-born."

The igneous rocks have been produced, as their name denotes, from the action of fire or subterranean heat, and are roughly divided into Plutonic and Volcanic, the broad distinction between the two being that in the case of the Volcanic the matter has come to the surface in a molten condition and there consolidated, while in the Plutonic the molten matter has never quite reached the surface, but has consolidated at a greater or less depth beneath it. Lava is the type of one, granite of the other. Between these two extremes in type there is a class of rocks called by the general name of Trap, which embraces porphyry, serpentine, syenite, greenstone, clinkstone, basalt, trachyte, and many others. They are all of igneous origin, unstratified, more or less crystalline, devoid of fossils, and form a connecting link between the ancient granite and modern lava. They are generally believed to have been formed of matter in a thoroughly molten state which, after being thrust up through rents and fissures in the crust, cooled off and solidified without, as a rule, breaking through the rocks upon the surface. That we see them to-day is due to the effects of water, air, and other agencies that have disintegrated and denuded those upper strata and left the trap exposed to observation. Many writers, Lyell among the number, associate them very closely with the volcanic rocks, and suggest that they may be the underground portions of once active volcanoes, the cones and craters of which have

been washed away in the course of ages, leaving the dikes or central vents as mementos of their descent and past ambition. "The abrupt manner," says Lyell, "in which dikes of trap usually terminate at the surface, and the water-worn pebbles of trap in the alluvium which covers the dike, prove incontestably that whatever was uppermost in these formations has been swept away. It is easy, therefore, to conceive that what is gone in regions of trap may have corresponded to what is now visible in active volcanos."

There are many other writers on geology, however, who are more inclined to give the traps a distinctive place to themselves, and to divide the unstratified rocks into Granitic, Trap, and Volcanic; and even Lyell feels compelled to say, "Although the principal component minerals of subaërial lava are the same as those of intrusive trap, and both the columnar and globular structure are common to both, there are yet some volcanic rocks which never occur as lava, such as greenstone, clinkstone, the more crystalline porphyries, and all those traps in which quartz and mica frequently appear as constituents. In short, the intrusive trap rocks, forming the intermediate step between lava and the Plutonic rocks, depart in their character from lava in proportion as they approximate to granite."

As seen to-day those masses of trap occur as—(1) dikes, or wall-like intrusions of igneous rock filling vertical or highly-inclined fissures in the crust, that vary from inches to fathoms in width, and from yards to miles in extent; (2) veins; (3) necks, or the filled-up pipes of former volcanic vents; (4) as huge masses, some of which are shapeless, some terraced, and more columnar and jointed; and (5) horizontal sheets, the lava outflow, as it were, of the dikes below, that have intercalated themselves between the bedding planes of other strata by thrusting upwards the overlying mass.

In every geological formation are the trap rocks found. Dikes and beds of greenstone, porphyry, clinkstone, and tuff have disturbed and metamorphosed the Cambrian and Silurian strata to such an extent as to make this system the

most dislocated of all formations ; the same traps, with claystone and amygdaloid, have intruded into the Old Red Sandstone ; some of these, with basalt in addition, have dislocated and faulted the coal beds of the Carboniferous era ; and so on down to the end of Tertiary time. They pierce the schists, the sandstones, limestones, even their own trap brethren, and assert the might and savagery of their nature by changing chalk and limestone to marble, sandstone to quartz, coal to coke, and shale to flinty slate and jasper. Most characteristic of all their forms is that of terraced hills, or large tabular masses that rise above one another like steps or stairs, a configuration which has given them their name of "Trap" (Swedish trappa, "a flight of steps"). But nowhere are they so conspicuous and imposing as when they assume that columnar and jointed aspect of which Fingal's Cave in Scotland, the Giant's Causeway in Ireland, and the Palisades on the Hudson are examples. It is impossible to gaze upon some of those massive dikes with solid walls as perpendicular and parallel, and joints as regular, as the most finished piece of masonry ; or on those "furnaced pillars" with well-shaped sides and nicely-fitting joints, that tower 200, sometimes 1,000 feet above the surface ; or on those terraced heights that step by step scale upwards to the heaven,—without harbouring the traditional belief that they were the work, in a sense, of giant hands. The cultured "Ettrick Shepherd" has thus immortalised both the Traps of Staffa and the tradition :—

"Awed to deep silence they tread the strand
Where furnaced pillars in order stand ;
All framed of the liquid burning levin,
And bent like the bow that spans the heaven ;
Or upright ranged in wondrous array
With purple of green o'er the darksome gray.
The solemn rows in that ocean den
Were dimly seen like the forms of men ;
Like giant monks in ages ago,
Whom the god of the ocean had scared to stone ;
And their path was a wondrous pavement old
In blocks all cast in some giant mould."

Those Traps, we repeat, are the Giant race of Mythology. The ancients regarded those rocks as observantly as ourselves; and, if our present knowledge be a criterion, they must have studied them well. They called them Giants (Γίγαντες), to denote their might, their size, their savage nature, and their connection with the depths of earth, for *γίγας* is (γίγνομαι αἶας) "born of the earth." They marked their igneous origin by asserting that they were born in the Phlegræan plains (φλέγω "to burn"); they looked upon the overlapping steps, and likened them to mountain piled on mountain whereby the giants might scale to heaven; they raised their eyes to the lofty, slender, prismatic columns, and called them the long spears ("δολίχ' ἔγχεα," Hesiod, 186) that were brandished by earth's warrior children.

They noted also the changes which were effected in the adjacent rocks, and concluded, as we do, that such consolidation and variety of appearance in the traps, and such faulting, dislocation, metamorphism, and general disturbance in the surrounding strata could not have occurred without consequent havoc to existing life,—in other words, that the Giants made war on Zeus, and that Hercules, or great earth movements, had been called into play and actively employed all through the contest.

Those Trap giants naturally commended themselves as a favourite theme to the earlier and later writers of the myths, and especially to Apollodorus, a thorough Plutonist, who writes of them *in extenso*. He adopts the theory of individuality maintained by many modern geologists, and disassociates those igneous rocks which are indubitably volcanic in character, that is, which are scoriaceous or vesicular and intercalated with bands of tuff, from the traps which are closer in grain and unaccompanied by tuff: the former he calls Typhaon, the latter the Giants.

His version runs thus :—

Γῇ δὲ περὶ Τιτάνων ἀγανακτοῦσα γεννᾷ Γίγαντας
ἐξ Οὐρανοῦ, μεγέθει μὲν σωματῶν ἀννπερβλήτους,
δυνάμει δὲ ἀκαταγωνίστους, οἱ φοβεροὶ μὲν ταῖς

- ὄψεσι κατεφαίνοντο, καθειμένοι βαθείαν κόμην ἐκ
 5 κεφαλῆς καὶ γενείων, εἶχον δὲ τὰς βάσεις φολίδας
 δρακόντων. ἐγένοντο δέ, ὥς μὲν τινες λέγουσιν, ἐν
 Φλέγραϊς, ὥς δὲ ἄλλοι, ἐν Παλλήνῃ. ἠκόντιζον δὲ
 εἰς οὐρανὸν πέτρας καὶ δρῦς ἡμένας.
 διέφερε δὲ πάντων Πορφυρίων τε καὶ Ἀλκυονεύς, ὅς
 10 δὴ καὶ ἀθάνατος ἦν ἐν ἥπερ ἐγεννήθη γῇ μαχόμενος.
 οὗτος δὲ καὶ τὰς Ἥλιου βάας ἐξ Ἐρυθείας ἤλασε. τοῖς
 δὲ θεοῖς λόγιον ἦν ὑπὸ θεῶν μὲν μηδένα τῶν Γιγάντων
 ἀπολέσθαι δύνασθαι, συμμαχοῦντος δὲ θνητοῦ τινὸς
 15 τελευτήσκειν. αἰσθομένη δὲ Γῇ τοῦτο ἐζήτει φάρμακον,
 ἵνα μὴδ' ὑπὸ θνητοῦ δυνηθῶσιν ἀπολέσθαι. Ζεὺς δὲ
 ἀπειπὼν φαίνειν Ἅοι τε καὶ Σελήνῃ καὶ Ἠλίῳ τὸ μὲν
 φάρμακον αὐτὸς ἔταμε φθάσας, Ἡρακλέα δὲ σύμμαχον
 δι' Ἀθηνᾶς ἐπεκαλέσατο. κἀκείνος πρῶτον μὲν
 ἐτόξευσεν Ἀλκυονέα· ὃ δὲ ἐπὶ τῆς γῆς μᾶλλον ἀνε-
 20 θάλπετο· Ἀθηνᾶς δὲ ὑποθεμένης ἕξω τῆς Παλλήνης
 εἴλκευεν αὐτόν. κἀκείνος μὲν οὕτως ἐτελεύτα.
 Πορφυρίων δὲ Ἡρακλεῖ κατὰ μάχην ἐφόρμησε καὶ
 ἥρα. Ζεὺς δὲ αὐτῷ πόθον ἥρας ἐνέβαλεν, ἥτις καὶ
 καταρρηγνύντος αὐτοῦ τοὺς πέπλους καὶ βιάζεσθαι θελοντος
 25 βοηθοὺς ἐπεκαλεῖτο· καὶ Διὸς κεραυνώσαντος αὐτὸν
 Ἡρακλῆς τοξεύσας ἀπέκτεινε. τῶν δὲ λοιπῶν Ἀπόλλων
 μὲν Ἐφιάλτου τὸν ἀριστερόν ἐτόξευσεν ὀφθαλμόν, Ἡρακλῆς
 δὲ τὸν δεξιόν· Εὐρυτον δὲ θυρσῷ Διόνυσος ἔκτεινε,
 Κλυτίον δὲ, φασίν, Ἐκάτη, μᾶλλον δὲ Ἡφαιστος βαλὼν
 30 μύδροις. Ἀθηνᾶ δὲ Ἐγκελάδῳ φεύγοντι Σικελίαν
 ἐπέρριψε τὴν νῆσον, Πάλλαντος δὲ τὴν δορὰν ἐκτεμούσα
 ταύτη κατὰ τὴν μάχην τὸ ἴδιον ἐπέσκεπε σῶμα.
 Πολυβῶτης δὲ διὰ τῆς θαλάσσης διωχθεὶς ὑπὸ τοῦ
 Ποσειδῶνος ἦκεν εἰς Κῶ· Ποσειδῶν δὲ τῆς νήσου μέρος
 35 ἀπορρήξας ἐπέρριψεν αὐτῷ, τὸ λεγόμενον Νίσυρον.
 Ἑρμῆς δὲ τὴν Ἄϊδος κυνέην ἔχων κατὰ τὴν μάχην
 Ἰππόλυτον ἀπέκτεινε, Ἄρτεμις δὲ Γρατίωνα, μοῖραι δὲ
 Ἄγριον καὶ Θόωνα χαλκείοις ῥοπαλοῖς μαχομένους. τὸν δὲ
 ἄλλους κερανοῖς Ζεὺς βαλὼν διέφθειρε. πάντας δὲ
 40 Ἡρακλῆς ἀπολλυμένους ἐτόξευσεν.—1. 6.—1. 6. 2. 5.

Gæa, being violently disturbed owing to the Titans, brings forth the Uranus-begotten Giants, who in height of body indeed did not overshoot the mark, but in force were irresistible. Imposing to the looks did they appear, wrapped as they were in deep covering on head and front; they had steps like the scales of dragons, were born in the Phlegræan territories, as some say, but, according to others, in Pallene; and they thrust up towards heaven both rocks and rooted trees.

All these were overtopped by Porphyryion and Alcyoneus, the latter of whom was also everduring in whatsoever region he happened to be contending, and he it was too that carried off the marine oxen from

Erythia. But among the immortals the general opinion was that none of the Giants could be utterly destroyed by the Gods, did not some mortal-born ally bring the thing to pass.

Now Gæa, being swelled out by expansion, sought this as an outward appliance, so that they might not be utterly destroyed by the mortal-born one; but Zeus, telling the sun, moon, and dawn to shine upon it, first cut up this outward appliance himself, then by means of Minerva summoned Hercules as an ally, and he discharged his shafts first of all at Alcioneus. This latter was overmuch heated again upon the earth; but Minerva having placed herself beneath, Hercules dragged him out of Pallene, and after such fashion did this one come to his end.

Porphyrion, in his fight with Hercules, rushed furiously upon Juno also. Then Zeus infused in him a yearning for Juno, who, as he commenced to rend her garments and desired to offer violence to her, called the allied forces to her aid; and when Zeus had struck him with the thunderbolt, Hercules stretched him low with his shafts.

Of those that remained, Apollo shot the left eye of Ephialtus, and Hercules the right; Eurytion was stretched out by Bacchus with his wand; Clytion, by Hecate, as some say, but preferably by Vulcan who struck him with his fire-stones; Minerva hurled the Sicilian island upon Enceladus when on the point of shrinking, and having cut the skin off Pallas, she covered the nucleus of his carcase in it all through the contest; Polybotes, chased through the sea by Neptune, came to Cos, and Neptune, having torn away that portion of the island which is called Nisyra, hurled it upon him; Mercury, possessed of Pluto's helmet during the battle, stretched out Hippolytus; Diana, Gratian; the Mæra, Agrios and Thoon who fought with metal clubs. Zeus, striking all that were left with his thunderbolts, withered them up; and Hercules cut them all down while perishing.

NOTES.

- 1 *περὶ Τιτάνων ἀγανακτοῦσα*.—The expansion of the imprisoned vapour in the interior urged the earth to further convulsions which brought on the eruptions of the Trap rocks.
- 2-8.—The principal characteristics of those Traps are enumerated: they did not reach the surface (*ἀνυπερβλήτους*); they were strongly eruptive (*ἀκαταγωνίστους*); imposing looking (*φοβεροί*); covered with superincumbent strata and vegetation (*βαθεῖαν κόμην*); had the form of steps (*βάσεις*) that overlapped each other like the scales of dragons; and thrust upwards by their eruptive force all (*πέτρας καὶ δρῦς*) that was above them. They are furthermore igneous in origin (*ἐν Φλέγγαις*). To say that they were born in Pallene is but to assert their igneous descent in other words, that is, that they were *impelled upwards* (*πάλλω* or *βάλλω*) by pressure from below.

- 9 διέφερε.—“To carry over, surpass,” that is, “to overflow.” The porphyry and serpentine Traps (Πορφυρίων τε καὶ Ἀλκονεὺς) broke through the surface and overflowed in lava beds. Lyell points to an instance in the rocks near Christiana where beds of euritic porphyry alternate with fossiliferous transition strata.
- 11 ἡλίου.—Ionic form of αἰλίου, “belonging to the sea”; so that ἡλίου βόας is but a compound word, and refers to the “marine oxen,” or *germs of mountains* produced by corrugations of the primal crust, as noticed in Geryon. This is further established by the words ἐξ Ἐρυθείας.
- 12 θεοὶς λόγιον.—That is, the “*literati*” were unanimous in believing that those molten masses of trap would be impervious to the attacks of life’s agents,—the air, rain, &c. (θεῶν), were they not aided by great earth movements (Hercules).
- 14 αἰσθόμενη—αἰσθω, “to breathe out.” This breathing, or swelling out on the part of earth, formed cones or dome-like masses of rock and clay that shielded, as it were, the dikes, sheets, and other forms of trap from rapid cooling and consequent solidification or destruction. In so far, it is confirmative of Lyell’s theory.
- 15 Ζεὺς δὲ.—But Life, the life of the Third Day that had grown and evolved still further when the Fourth Day brought the sun, moon, and stellar bodies into being, was actively employed upon those outward appliances. In many ways did it cut up the cones or domes, by its roots which pierced and loosened the soil and rocks, by the rain that hammered and the running water that scoured them, by the burrowing of creeping things, by decay and consequent decomposing gases, by many other processes, all of which lead to the disintegration and destruction of rocky strata.
- 17 Ἡρακλία σύμμαχον.—The demolition begun by life was aided and completed by those *great earth movements* (Hercules) that were called into operation through the *organised structure* (Minerva) of its being. “In the revolutions to which the crust of the earth has been subjected, however, the subterranean continuations of volcanic sheets have often been laid bare, and not only so, but sections have been opened into the very heart of masses which, though molten and eruptive, seem never to have been directly connected with actual volcanic outbursts.”—*Encyc. Brit.*
- 19 Ἀλκονεά.—That this is identical with serpentine may be deduced by comparison.
- Serpentine, for instance:
- (1) is found associated with the gneisses and other schistous rocks of the oldest mountains, such as the Laurentian Hills of the Archæan age;

(2) is an exceedingly durable rock;

(3) is believed to be, in part at least, an original deposit of oceanic waters.

Alcyoneus, on the other hand:

(1) is said to have carried off the marine oxen, that is, the oldest mountains from the depths of ocean;

(2) is styled everduring (*ἀθάνατος*);

(3) is, as the derivation (*ἐκ τῆς κύας*) denotes, "sea-born."

To say that "Minerva placed herself beneath" is but to say that serpentine is associated with the organised or stratified limestone, through which it is drawn out or dragged (*ἐλκυσεν*) in bands. "With many Palæozoic limestones, and more particularly with the crystalline beds which occur among the schistose rocks, serpentine is frequently associated."—*Encyc. Br.*

22 *Πορφυρίων*.—The name tells its own story. It is the quartz-porphry, or felsite porphyry, which occurs not only as veins, necks, &c., but also as submarine or subaërial flows of lava, or sheets. It is a distinguishing characteristic of sheets of trap that they do not rigidly conform to the bedding, but *break into* and involve portions of the overlying strata. Particularly is this so with the porphyry, as witnessed in the Silurian rocks; and a remarkable feature of the Permian formation is the outpouring of great sheets of quartz-porphry, granitic-porphry, porphyrites, and melaphyre. This yearning for and rending of the surface overhead is mentioned by Apollodorus (*πίθον Ἥρας*—*καταρρηγνύντος*), and the outpouring in sheets is marked by *ἀπέκτεινε* (*ἀπεκτείνω*).

26 *τῶν δὲ λοιπῶν*.—He now proceeds to classify the remaining traps according to the shape of the channel by which the molten rock escaped.

27 *Ἐφιάλτου*.—*ἐπὶ ἀλλομαι*, "to spring or leap upon; to weigh upon," as observable in *ἐπιάλης*, "the nightmare, the Latin *incubus*," that weighs upon the sleeper's chest; hence anything that weighs on something else, as a "wall" does on the ground. So, too, *φιάλη* (Latin *vallus*, our English "wall"), "sunken work."

The molten trap came up through fissures in the rocks, and formed dikes which are now visible as walls (raised dikes), or as deep trenches (sunk dikes), according as the surrounding rock in one case or the trap itself in the other has been destroyed. We ascribe the decay in both cases to atmospheric action; but Apollodorus suggests that, while this action (Apollo) was effective in decomposing the surrounding rocks—and the *better* of the two (*ἀριστερόν*),—it was the great earth movements (Hercules), which made the fissure originally, that emptied the receptacle (*δεξιὸν δέχομαι*) of its contents.

28 *Εὔρντον*.—*εὖ ῥύω*, "well wrinkled, sinuous,"—the tortuous veins,

or portions of molten trap injected into rents of previously solidified rocks by some means no better understood to-day than by what the myth tells us, namely, wherever freedom (Bacchus or Liber) pointed out the way. The *ἐκτείνε* (*ἐκτείνω* "to spin out") marks the ramifications.

Horace refers to the same giant form in Ode ii. 19, under the slightly altered name of *Rhætus*, and marks the tortuous character of the veins by *retorsisti*, and the entire general appearance of ramifications from a central mass by the claws and mandible of a crab (*leonis*):—

Tu, quum parentis regna per arduum
Cohors Gigantum scanderet impia,
Rhætum retorsisti leonis
Unguibus horribilique mala.

When Giant crew would impious scale
The realms on high of parent thine,
With crabbish claws and Gorgon jaw
Did'st thou twist Rhoetus back.

- 29 *Κλυτίον*.—From *κλύζω*, and signifying, like *κλυστήρ*, "a pipe or funnel,"—in allusion to the "necks," the filled up pipes, it is supposed, of past volcanoes, the cones and craters of which have been removed by extensive denudation, leaving those orifices bare to view. They are filled up with crystalline material, such as quartz-porphry, felstone, basalt, clinkstone, &c.; or with fragmental matter that fell back after each eruption into the throat of the volcano, and there solidified; or by both. It is this fragmental débris (*μύδρους*) that recommends itself to Apollodorus as having destroyed Clytion, in preference to subsidence or Hecate. That there is, however, some authority for ascribing the destruction to Hecate may be gathered from the following passage in the *Encyc. Brit.*: "Pieces of fine stratified tuff not infrequently appear in the agglomerates. This fact, coupled with the not uncommon occurrence of a tumultuous fractured and highly-inclined bedding of the materials in the necks, appear to show that the pipes were partly filled up by the subsidence of the tuff consolidated in beds within the crater and at the upper part of the funnel."
- 30 *Ἐγκελάδης*—*ἄγκυλος εἶδος*, "of a curved or rounded form," that is, the prismatic, columnar form assumed sometimes by trap, as exhibited in the Giants' Causeway, Fingal's Cave, &c. How this columnar structure has been produced is a matter of much discussion, but the most accepted theory, that of Mallet, agrees with the myth in believing it to be due to slow cooling, or shrinking (*φείγοντι*).
- 21 *Πάλλαντος*.—As Enceladus represents the columnar form of trap, so does Pallas represent the globular (*πάλλα*, "a ball or sphere").

"In some masses of decomposing greenstone, basalt, and other trap rocks," says Lyell, "the globular structure is so conspicuous that the rock has the appearance of a heap of large cannon-balls." He instances a pitchstone-porphry in one of the Ponza islands, and quotes thus from Scrope: "When the balls have been exposed a short time to the weather, they scale off at a touch into numerous concentric coats, like those of a bulbous root, inclosing a compact nucleus. The laminæ of this nucleus have not been so much loosened by decomposition; but the application of a ruder blow will produce a still further exfoliation." It is evident that the *nucleus* of the geologist is the *ἴδιον σῶμα* of the mythologist, and that it is enveloped by its own skin, that has been *flayed* as it were. Since this concentric coating is the nearest approach that a mineral can make to organised arrangement, Minerva, the organising goddess, has been assigned as the destroying agent. It may be remarked here that the fact of our globe as a whole (*πάλλα*) being a highly organised structure accounts for the common epithet of "Pallas Minerva."

- 33 *Πολυβότης*.—Submarine eruptions are not unknown in our time, but in the early ages of the world they were far more frequent and general, thereby causing that humped or irregularly undulating condition of the ocean's bed which exists more or less to-day. This is expressed by saying that Polybotes (*πολύς ἰβόω*, "the much humping") was driven through the sea where, after forming *hillocks* (*χόος*), he was overwhelmed by the *alluvial deposits* (Nisyra, that is, *νίζω σύρω*, "the washings dragged along") which the ocean and running water (Neptune) had broken off from those same hillocks as well as from islands above the sea-level. "Subterranean movements," says Lyell, "have caused almost everywhere in regions of active volcanoes, great changes in the relative level of land and sea, in times comparatively modern, so as to expose to view the effects of volcanic operations at the bottom of the sea. Thus, for example, the recent examination of the igneous rocks of Sicily, especially those of the Val di Noto, has proved that all the more ordinary varieties of European trap have been there produced under the waters of the sea, at a modern period; that is to say, since the Mediterranean has been inhabited by a great proportion of the existing species of testacea. These igneous rocks of the Val di Noto, and the more ancient trappean rocks of Scotland and other countries, differ from subaërial volcanic formations * * * * in the absence of regular cones and craters, and in the want of conformity of the lava to the lowest levels of existing valleys. It is highly probable, however, that insular cones did exist in some parts of the Val di Noto; and that they were removed by the waves.

* * * * A multitude of causes tend, near the land, to reduce the bottom of the sea to a nearly uniform level,—the sediment of rivers,—materials transported by the waves and currents of the sea from wasting cliffs,—showers of sand and scorïæ ejected by volcanoes, and scattered by the wind and waves. When, therefore, lava is poured out on such a surface, it will spread far and wide in every direction in a liquid sheet, which may afterwards, when raised up, form the tabular capping of the land."

- 37 Ἱππολυτον.—The "ἵππος" here, as elsewhere, has reference to the granite charger, and the qualifying "λυτος" (λύω "to weaken, to relax") tends to point out Hippolytus as denoting such rocks as syenite, diorite, dolerite, diabase, and others of the "greenstone" group, whose texture is of that crystalline kind commonly called *granitic*. They are erupted in irregular masses and intrusive sheets, and send out highly tortuous veins which pierce, alter, and cut across the surrounding rocks. All these, as the myth says, were brought to an end or stretched out by fluxion (Mercury) operating at a considerable depth beneath the surface.

Γραρίωνα.—Another form of intrusive veins, distinctly peculiar, is that which runs horizontal for a space, then upward, then horizontal again, and so on in what may be called a *much-broken* or zig-zag (ρακτός) fashion. This, says the writer, was stretched out by Diana, or refraction.

- 38 Ἀγριον καὶ Θόωνα.—Allusion is now made to the sheets in which trap rock occur. These are characterised (1) by *roughness* (ἄγριος) of the upper surface, owing to their breaking into and involving portions of the overlying strata; (2) by *rushing* (θοός) across the bedding, and running along on a different platform.

It may be said, then, that it was these strata or *divisional planes* (μοῖραι) that stretched out the trap in sheets.

The words "χαλκείαις ῥοπάλοις" have reference to the metalliferous veins or lodes in connection with the trap rocks. "Granite, syenite, and those porphyries which have a granitiform structure, in short, all plutonic rocks, are frequently observed to contain metals at or near their junction with stratified formations."—*Lyell*.

CHAPTER IV.

THE VOLCANO *VERSUS* LIFE.

The Battle of Typhæus.—However close or remote may be the relationship between the trap rocks and their igneous brethren, sufficient evidence, such as masses of tuff hundreds of feet thick, and either alone or associated with interbedded lavas, remains to prove that volcanic energy, apart altogether from the intrusive trap, has been rife at every period of the earth's existence since Palæozoic time, and that every great formation from the Silurian onwards has had its own volcanoes, even though the craters, cones, and all elevated traces of such have disappeared. In every way, the prodromes of disturbance, ejection of lava and fragmentary materials from the depths below, the formation of a cone built gradually from this erupted matter and intersected with pipes and fissures, the crater connected with a central vent,—in all these ways, as well as in lineal arrangement and intervals of activity and repose, do they appear to have resembled those of our own day. The only difference is that, while possibly occurring singly on no more violent a scale than those of the historic period, they seem to have acted simultaneously over a wider geographical range; for those now active have, as a rule, broken out on the sites of prehistoric ones, and those now extinct, not to mention such as have lost all visible evidences of cones and craters, were assuredly once active, and far outnumber the living ones of to-day.

It is those volcanoes of the past, which, then as now, waged a destructive war on existing life, that Apollodorus next describes under the general name of Typhaon. The word, *Τυφών*, could hardly be better chosen, since *smoke* or *vapour* (*τῦφος*) is the inevitable accompaniment of volcanic

energy. "Gases and vapours play an important part in volcanic activity; they show themselves in the earliest stages of a volcano's history, and continue to appear for centuries after all the other evidences of subterranean action have ceased to be manifested. By much the most abundant of them all is *steam*."—*Encyc. Brit.* It may be remarked that the marvellous being has left a memorial of his name in our literature, since the word "tuff" is, as defined by Lyell, "a substance produced by the showering down from the air, or incumbent waters, of sand and cinders, first shot up from the interior of the earth by explosions of volcanic gases."

Apollodorus writes thus:—

- ὥς δὲ ἐκράτησαν οἱ θεοὶ τῶν Γιγάντων, Γῆ μᾶλλον
 χολωθείσα μίγνυται Ταρτάρῳ, καὶ γεννᾷ Τυφῶνα ἐν
 Κιλικίᾳ, μεμιγμένην ἔχοντα φύσιν ἀνδρὸς καὶ θηρίου.
 οὗτος καὶ μεγέθει καὶ δυνάμει πάντων διήνεγκεν
 5 ὅσους ἐγέννησε Γῆ, ἣν δὲ αὐτῷ τὰ μὲν ἄχρι μηνῶν
 ἄπλετον μέγεθος ἀνδρόμορφον, ὥστε ὑπερέχειν μὲν πάντων
 τῶν ὄρων, ἣ δὲ κεφαλὴ πολλὰκις τῶν ἀστρῶν ἔψανε·
 χεῖρας δὲ εἶχε τὴν μὲν ἐπὶ τὴν ἐσπέραν ἐκτεινομένην
 τὴν δὲ ἐπὶ τὰς ἀνατολάς· ἐκ τούτων δὲ ἐξείχον ἑκατὸν
 10 κεφαλαὶ δρακόντων. τὰ δὲ ἀπὸ μηνῶν σπείρας εἶχεν
 ὑπερμεγέθεις ἐχιδνῶν, ὧν ὄλκοι πρὸς αὐτὴν ἐκτεινόμενοι
 κορυφὴν συριγμὸν πολλὸν ἐξείσαν. πᾶν δὲ αὐτοῦ τὸ
 σῶμα κατεπτέρωτο, αὐχμηραὶ δὲ ἐκ κεφαλῆς καὶ γενείων
 τρίχες ἐξηνεμοῦντο, πῦρ δὲ ἐδέρκετο τοῖς ὅμμασι.
 15 τοιοῦτος ὢν ὁ Τυφὼν καὶ τηλικούτος ἡμμένας βάλλων
 πέτρας ἐπ' αὐτὸν τὸν οὐρανὸν μετὰ συριγμῶν ὁμοῦ καὶ
 βοῆς ἐφέρετο· πολλὴ δὲ ἐκ τοῦ στόματος πυρὸς ἐξέβρασσε
 ζάλη. θεοὶ δὲ ὥς εἶδον αὐτὸν ἐπ' οὐρανὸν ὀρμώμενον,
 εἰς Αἴγυπτον φυγάδες ἐφέροντο, καὶ διωκόμενοι
 20 τὰς ἰδέας μετέβαλον εἰς ζῶα. Ζεὺς δὲ πόρρω μὲν
 ὄντα Τυφῶνα ἔβαλλε κεραυνοῖς, πλησίον δὲ γενόμενον
 ἄδαμαντίνῃ κατέπτηξεν ἄρπῃ, καὶ φεύγοντα ἄχρι τοῦ
 Κασίου ὄρους συνεδίωξε· τοῦτο δὲ ὑπέρεκειται Συρίας
 κείθι δὲ αὐτὸν κατατετρωμένον ἰδὼν εἰς χεῖρας συν-
 25 βαλε· Τυφῶν δὲ ταῖς σπείραις περιπλεχθεὶς κατέσχευ
 αὐτόν, καὶ τὴν ἄρπην περιελόμενος τὰ τε τῶν χειρῶν
 καὶ τῶν πυδῶν διέτεμε νεῦρα, ἀράμενος δὲ ἐπὶ τῶν
 ὤμων διεκόμισεν αὐτὸν διὰ τῆς θαλάσσης εἰς Κιλικίαν
 καὶ παρελθὼν εἰς τὸ Κωρύκιον ἄντρον κατέθετο.
 30 ὁμοίως δὲ καὶ τὰ νεῦρα κρύψας ἄρκτον δορᾷ κείθε
 ἀπέθετο, καὶ κατέστησε Δελφύνην δράκαιναν· ἡμίθηρ

- δὲ ἦν αὐτῇ ἡ κόρη. Ἑρμῆς δὲ καὶ Αἰγίπαν ἐκκλέψαντες
τὰ νεῦρα ἤρμωσαν τῷ Διὶ λαθόντες. Ζεὺς δὲ τῇ
ιδίαν ἀνακομισάμενος ἰσχὺν ἐξαίφνης ἐξ οὐρανοῦ, ἐπὶ
35 πτηνῶν ὀχούμενος ἵππων ἄρματι, βάλλων κερανοῖς
ἐπ' ὄρος ἐδίωξε Τυφῶνα τὸ λεγόμενον Νῦσαν, ὅπου
μοῖραι αὐτὸν διωχθέντα ἠπάτησαν· πεισθεὶς γὰρ ὅτι
ῥωσθήσεται μᾶλλον, ἐγέυσατο τῶν ἐφημέρων καρπῶν.
διόπερ ἐπιδιωκόμενος αὖθις ἦκεν εἰς Θράκην, καὶ
40 μαχόμενος περὶ τὸν Αἶμον ὅλα ἔβαλλεν ὄρη. τούτων δὲ
ἐπ' αὐτὸν ὑπὸ τοῦ κερανοῦ πάλιν ὠθουμένων πολὺ
ἐπὶ τοῦ ὄρους ἐξέκλυσεν αἷμα· καὶ φασὶν ἐκ τούτου
τὸ ὄρος κληθῆναι Αἶμον. φεύγειν δὲ ὀρμηθέντος αὐτοῦ
διὰ τῆς Σικελικῆς θαλάσσης, Ζεὺς ἐπέρριψεν Αἴτην
45 ὄρος ἐν Σικελίᾳ· τοῦτο δὲ ὑπερμέγεθός ἐστιν, ἐξ οὗ
μέχρι δευρὸ φασὶν ἀπὸ τῶν βληθέντων κεραυνῶν
γίνεσθαι πυρὸς ἀναφυσήματα. — 1. 6. 3.—1. 6. 3. 12.

Now, as the Gods proved superior to the Giants, Gæa, more stirred up than ever, is mingled with Tartarus, and in a cone begets Typhaon who had his nature mixed up with that of man and beast. In both size and might indeed he outmeasured all others, many and great as they were that were born of Gæa. From the thighs upwards his parts formed a huge manly mass, so as to raise him above all the mountains; many times did his head approximate the stars; hands too he had, one verging upon the west, and another on the east; and from these stood forth a hundred dragon heads. But the parts from the thighs down had serpentine windings to an immense degree, whose trails, stretching to the very summit, emitted much rumbling; all his body was furnished with wings; the tangled covering of his head and jaws was shaken by the wind; and fire darted from his eyes. A being of such nature was Typhaon produced, and one that, when old enough, hurled against the very heaven red-hot rocks in the midst of combined rumblings and explosion; and great was the surge of fire that was vomited from his mouth.

Now the Gods, when they saw him advancing upon heaven, were borne dispersedly in the superincumbent waters, and such as followed these archetypes changed to animals. But later on indeed Zeus struck this being, Typhaon, with his bolts; forced him with adamantine hook to cringe when near; followed him, retreating, up even to the chasm of the mountain; now this lies over the central vent, and there, seeing him sorely scotched, he took him in hands.

Then Typhaon, having entangled him in his folds, held him fast, and rooting out the hook all round, cut in pieces the nerves of both hands and feet; then heaving him high upon his shoulders he carried him in the cone through the sea; and overflowing on the saffron-like grot, was there deposited. And there in like fashion too did he cover and preserve the nerves in the hide of the great bear; and there did he deposit the dolphin-saurian,—for half a beast was this same

creature. But those cunning appropriators, regular progression and vivifying nature, secretly fitted nerves to Zeus.

Now Zeus, having acquired his proper strength in an unlooked for degree from on high, and being borne on a chariot of winged horses, pursued Typhaon with his thunderbolts to the turning point, the pillar so to speak, where the divisional planes circumvented him while shrinking; for prompted by the feeling that he could rush still further, he made trial of regularly arranged ball and socket joints.

Persistently pursued then, he came in course of time to Thrace, and whilst warring around Hæmus he threw up whole mountains. These being thrown back upon him by the thunderbolts, his life juice in abundance streamed forth upon the range; and hence, they say, was the range called Hæmus. Then, while endeavouring to retreat through the Sicilian sea, Zeus hurled Mount Ætna in Sicily upon him; and this is of immense size, from which up to the present date eruptions of fire burst forth, due, as the rumour goes, to the thunderbolts that were hurled.

NOTES.

- 1 The "ὥς," the context, and the myth as a whole, tend to show that, while the interval between the inception of eruptive trap and of volcanic action was comparatively short, the latter however was in point of time subsequent to the former.
- 3 *Κηλίκη*—*κηλίκιον*, "a small cup," (the *υ* being changed into *ι*, as in *φιτώ*, *φλιδάω*, for *φυτεύω*, *φλυδάω*). A volcano is defined as a conical or cup-shaped eminence, formed not by upheaval, as in the case of mountains, but by material ejected from below and accumulated at the surface around the vent of eruption. The tendency in construction is invariably to the form of a cone.
μεμυγμένην φύσιν.—Volcanic action has been at work in every age from the early Palæozoic with its purely animal forms to the coming of man, and even to the present date.
- 4 *μεγέθει καὶ δυνάμει*.—Stromboli, Vesuvius, and Hecla are three well-known volcanoes, about 3000, 4000, and 5000 feet respectively in height. Placed one on top of the other they would be but little more elevated than Ætna which is two miles high and over; Stromboli put on Ætna would give the height of Mauna Loa, a volcano in the Sandwich Islands; to this add Hecla, and we would behold Popocatepetl in Mexico; and let us pile all three, Stromboli, Vesuvius, and Hecla, on top of Ætna itself, and we would not yet have the height of Sahama, the Peruvian Typhaon, that rises to an elevation of over four miles.

So much for the *μεγέθος*; and as to the *δυνάμει*, in an eruption of Ætna in 1693, the city of Catania was destroyed in a few moments, and 18,000 people perished in the ruins; in 1783 Hecla ejected two streams of lava from 40 to 50 miles long, 7 to 13 feet broad, and 100 to 600 feet deep, whereby 20

villages and 9000 people were destroyed ; in 1815 the explosions of Tomboro were heard at a distance of 900 miles, the ashes darkened the air for 300 miles around, the cinders floating on the sea to the windward of Sumatra formed a mass two feet thick and several miles long, and over 11,000 persons were destroyed.

- 6 *ἀνδρόμορφον*.—There is much to recommend the simile. A volcano has an upright trunk, ramified channels, through which, like the blood in arteries, flows the lava, and a central vent ; it has periods of activity and repose, and the history of a volcano, like that of man, is one, as Hutchison remarks, of youth, middle age, old age, and decay. Again, we say “a mountain of a man,” to mark the superiority in some respects of an individual above his fellow men ; and the simile may be reversed to denote the superiority of a volcano above its fellow mountains.
- 7 *ἀστρων ἔψανε*.—That is, by repeated additions (*πολλάκις*) to the height of the cone, and consequent elevation of the mountain. As long as the activity of a volcano exists, so long is the work of construction going on to some extent.
- 8 *χείρας*.—The dominant arrangement of volcanoes is in lines east and west along the coasts of continental areas. Thus, beginning with the Andaman isles in the Bay of Bengal, there is a chain of active or extinct volcanoes running along the entire eastern coast of Asia and embracing Sumatra, Java, the Moluccas, Philippines, Japan, Kurile Islands, Kamschatka, and Aleutian isles. There is a similar volcanic range along the west coast of North and South America, manifesting itself by eruptions along the whole line from Alaska through the Rocky Mountains, Cordilleras, and Andes, down to Terra del Fuego. From these eastern and western hands stand forth, it is not too much to say, a hundred volcanic vents or heads out of the 200 or more that are in activity throughout the earth, not to mention those that are dormant or extinct.
- 10 *σπείρας ἐχιδνῶν*.—The sinuous fissures communicating with the molten interior and reaching to the summit (*κορυφήν*). They radiate from the focus of action and sometimes ramify and intersect in all directions. In the eruption of *Ætna* in 1660, one of many fissures that appeared ran in a winding course for a distance of 12 miles from the side of the mountain to within a mile of the top.
- 13 *κατεπτέρωτο*.—That is, “with the means of flight.” So does Shakespeare say, “Let fiery expedition be my wing.” From the rents and clefts that open at all points on the outside of the cone, as well as from those on the sides and bottom of the crater, jets of steam and gaseous vapour rush forth like so many pinions, and so numerous at times as to conceal the rock from view.

- 14 *τρίχες*.—Wild vines and brushwood grew luxuriantly in the crater of Vesuvius previous to the famous eruption of 79 A.D., and again during the long interval of quiescence between the eruptions of 1500 and 1637. The older tuffs of the same volcano exhibit numerous remains of the trees and shrubs which clothed its flanks at successive periods.
- 15 *ἡμμένας πέτρας*.—Mantell, an eye-witness of one of the eruptions of Mount *Ætna*, writes thus: "If any person could accurately fancy the effect of 500,000 sky-rockets darting up at once to a height of three or four thousand feet, and then falling back in the shape of red-hot balls, shells, and large rocks of fire, he might have an idea of a single explosion of this burning mountain; but it is doubtful whether any imagination can conceive the effect of one hundred of such explosions in the space of five minutes, or of twelve hundred or more in the course of an hour, as we saw them."
- 19 *Αἴγυπτον*.—The word, like *Cilicia*, is chosen for the idea intended to be conveyed, namely, "on the waters over the submerged land." The derivation is *γαῖα ὑπτιος*, "the land in a contrary position to its usual one," and as the ordinary and proper position is one of elevation, *Αἴγυπτος* consequently denotes "the land submerged." Egypt from the earliest historic times has been noted for the inundations of the Nile, so much so that the verb *αἰγυπτιάζω* has been used to signify "to be like Egypt, that is, to be under water."
- φυγάδες*.—The first indubitable traces of vegetable life are found in the Cambrian rocks, and consist entirely of algæ or sea-weeds that floated (*φυγάδες ἐφέροντο*) on the waters.
- 20 *ζῶα*.—Vegetation, the primal form of organised existence, was followed by animal life. This establishes the chronology of this portion of the myth, Biblically with the beginning of the Fifth Genesiac Day, and geologically with the beginning of Silurian time, since it is in the Cambrian rocks of that period that animals make their first appearance, and these are all of the marine type.
- Ζεὺς δὲ πόρρω*.—But later on in Silurian days, when the volcanic giant had raised his head nearer (*πλησίον*) to the domain of vital operations, Life attacked him with the lightning which it attracted, with the rootlets or hooks (*ἄρπη*) of algæ and other fucoids, with saxicavous mollusks that bored into the mass, with air and rain, with everything that tended to weather and decompose the rock, and so make it cringe or contract (*κατέπηξεν*) upon itself.
- 22 *ἀδαμαντίνῃ ἄρπῃ*.—Every crag, and rock, and architectural ruin, bears witness to the *unconquerable ravages* of atmospheric influences and of vital agencies. As an instance of what weathering can accomplish, granite has been dug into for a

depth of 30 feet, owing to the decomposition of its felspar into kaolin.

φεύγοντα ἄχρι.—Life followed up its advantage over the *shrinking* and temporarily quiescent giant by establishing a growth of vegetation not only as far as the crater's mouth (Κασίου—χάσις, "a chasm"), but even over the sides and floor of the crater itself. From this spot, which was directly over the central vent (Συρίας, from *συρίζω*, and like *σῦριγξ*, "a pipe or funnel"), did Life look down with the complacency of triumph upon its badly mutilated foe.

- 25 περιπλεχθεῖς.—It was a dangerous position that Life had chosen : for centuries, it may be, after the copsewood had become fast-rooted in the flanks and crater (κατέσχευε), the volcano, that was dormant (κατατετρωμένον), not extinct, resumed its activity once more. Lava poured forth from every rent and fissure in the sides, and in this way, aided by the decomposition and disintegration of the rock through weathering, was the connecting hook of vegetable growth removed from the slopes ; volumes of vapour and super-heated steam rushed from innumerable clefts and crannies in the sides and crater, and thus were the nerves of existing animal life lacerated ; finally, with one tremendous explosion, the entire top of the cone, with crater and life forms, was blown into fragments that rose thousands of feet above the mountain's shoulders (ἀράμενος, &c.) and were subsequently scattered over the neighbouring sea (διὰ τῆς θαλάσσης).

An explosion similar to this in every way occurred to Vesuvius in 79 A.D., and in 1822 the top of the same volcano was blown off to the extent of more than 800 feet.

Krakatoa, in the Straits of Sunda, had at one period a cone with a base of 25 miles in circumference, and a height of 10,000 feet. An eruption, the date of which is not known, occurred and blew away the cone, leaving but a height of a few hundred feet.

- 29 παρελθών.—Following the explosion the lava *overflowed* in torrents that spread over the bed of ocean and helped to cover up the tuffs, scorixæ, dust, &c., and the organic relics, all of which had resulted from the eruption that demolished the cone and crater. "In the earth's crust," says Lyell, "there are volcanic tuffs of all ages, containing marine shells, which bear witness to eruptions at many successive geological periods. These tuffs, and the associated trappean rocks, must not be compared to lava and scorixæ which had cooled in the open air. Their counterparts must be sought in the products of modern submarine volcanic eruptions."

Κωρύκιον.—The "Corycian cave," alluded to by Pindar, Strabo, and Æschylus, as the abode of Typhaon, and famous for its *saffron* (κρόκος), whence the name Corycian. *Saffron* is used as a

simile for *tuff*, owing to its being light, porous, fibrous in texture, and yellowish or reddish brown in colour, as some tuffs are. It is in these tuffs that the fossil remains of life are generally found. "Small irregular fragments of the scorixæ and pumice above mentioned, and the dust of the same, produced by volcanic explosions, form the tuffs which abound in all regions of active volcanoes, where showers of these materials, together with small pieces of other rocks ejected from the crater, fall down upon the land or into the sea. Here they often become mingled with shells, and are stratified."—*Lyell*.

- 30 *δοῖλος, ἄρκου*.—In a similar way did the lava and tuffs cover and conceal the fossil remains of later ages,—of the mammoth, for instance, which, clothed as it was in a mixture of hair and wool, is evidently the *ἄρκος* or "great bear" alluded to by Apollodorus, just as the "dolphin-dragon" is probably the ichthyosaur or some other of the strange deinosaurs—half fish, half beast—that flourished up to the opening of the Tertiary period.

"Extinct quadrupeds of that era," says Lyell of the Miocene, "belonging to the genera Mastodon, Rhinoceros, and others, were buried in ashes and beds of alluvial sand and gravel, which owe their preservation to sheets of lava which spread over them."

- 32 *Ἐρμῆς*.—The efforts of the volcanic giant were in vain, however, for destroy as he might, and cover and conceal as he would, form after form of the life that was, the regular course of events (*Ἐρμῆς, ῥέω*) and the all-vivifying power of nature (*Διγίγαν, αἰσσω πᾶν*) brought into being others of their type.

- 33 *Ζεὺς δέ*.—We are now led on to the Tertiary period, remarkable—(1) for the ushering in of life in its highest and most potential (*ἰδίαν ἰσχύν*) form, namely, the mammal; and (2) for the last great general exhibition of volcanic energy.

The previous period was distinguished for its reptiles, as the one before it was for its mollusks; but now in Cainozoic or Tertiary time, vegetation began to assume the forms of to-day, and the mammals, though uncouth and strange at first, gradually verged into species closely like those of the present age. Thus, among the Pliocene or late Tertiary remains in the Upper Missouri region there are enumerated species resembling our camel, rhinoceros, elephant, deer, wolf, fox, tiger, beaver, porcupine, "and four or five species of the horse family, one of which was closely like the modern horse." Birds too now appeared in numbers. So that the writer feels justified in describing Life as borne on a chariot "of winged horses."

- 34 *ἐξ οὐρανοῦ*—The "development theory" of Darwin finds no support from those words. The Greek evidently believed that a new species, the mammal for instance, meant a new creation.

35 *κεραυνούς*.—The general accompaniments of violent volcanic eruptions are darkness, thunder and lightning, explosive reports, and earthquake shocks.

36 *Τυφώνα*.—But, if Zeus became thus remarkably endowed at this period with strength and activity, so too did his Typhœan foe, for Geology notices the fact of widespread and vigorous volcanic action with successive outpourings of lava on a prodigious scale all during the Miocene or Middle Tertiary time. In France, Spain, Italy, Sicily, and Greece, in the West Indies, Central America, and the Andes, even in arctic Greenland there are found evidences plain and plentiful pointing to the fierceness of the fight, and to battle grounds gory with the lava that flowed from the giant's wounds. Hundreds of maimed volcanoes in Auvergne, Velais, and Vivarais in Central France, attest how Zeus blew off the monster's heads, and the basaltic plateaux of Antrim in Ireland and of Mull in Scotland mark some of the spots where, all surrounded by joints (*μοῖραι—μείραι*, "to divide") while cooling (*διωχθέντα*) or shrinking, the lava was tempted to make trial of the columnar structure.

ἐπ' ὅρος.—Literally, "to the serum" (*ὀρός*) or watery part of blood and other more or less viscid fluids. Blood before coagulation consists of (1) Globules, and (2) Plasma, this latter containing fibrine, albumen, water, and salts; after coagulation, blood is separated into (1) Clot, which contains the globules and fibrine, and (2) Serum, which contains the albumen, water, and salts. Microscopic examination of the lava tends to show that it consists fundamentally of (1) a glassy base, and (2) of microlites, crystals, and interstitial aqueous vapour, the component molecules of which are diffused through this base. It is also shown that as lava advances from a fluid to a solid state, "clots," as it were, the amount of aqueous vapour diminishes, while the microlites and crystals develop and increase.

The idea of the Greek writer then, namely, that the *serum* is the "turning point" in coagulation, whether of blood or of lava, is perfectly legitimate, has much to recommend it, and has been developed by Gregory Watt who attributed the columnar structure of lava to the production of globules or spherical concretions in the cooling mass.

Νύσσαν—νύσσα, "a turning post or pillar" in a racecourse. Life with its electricity pursued the lava in its onward course till it reached the turning point, and began to pass from the fluid to the solid state. What further ensues is thus described in the *Encyc. Brit.*: "In passing from a fluid to a solid condition, and thus contracting, lava acquires different structures. Lines of divisional planes or joints traverse it, especially perpendicular to the upper and under surfaces of the sheet. These lines

at various irregular distances cross each other so as to divide the rock into rude prisms. * * * Where this arrangement occurs, as it does so commonly in basalt, the mass is divided into tolerably regular pentagonal, hexagonal, or irregularly polygonal prisms or columns, set close together at a right angle to the main cooling surfaces. These prisms vary from two or three to eighteen or more inches in diameter, and range up to 100 or even 150 feet in length. * * * In the more perfectly columnar basalts the columns are sometimes articulated, each prism being separable into vertebræ, with a cup and ball socket at each articulation."

38 *ῥωσθήσεται*—*ῥώομαι*, "to dart, to rush."

ἐφημέρων.—*ἐφημερίς* signifies "a diary, journal, calendar," and in general "a record or tabular statement of daily events." Hence the adjective, *ἐφήμερος*, may be used to signify either of the dominant ideas implied in its substantive, that is, "lasting but for a day, ephemeral," or, as it is used here by Apollodorus, "regularly arranged, tabulated or tabular," as the columnar structure of lava is.

καρπῶν—*καρπός*, "the wrist joint." The term is chosen advisedly; for the wrist, as described in works on anatomy, presents many of the characters of an enarthrodial ("ball and socket") joint.

39 *διώπην*.—All that follows may be considered as happening in the historic era, or closely preceding.

"One portion of the lavas, tuffs, and trap dikes of *Ætna*, *Vesuvius*, and the island of *Ischia*, has been produced within the historical era; another and a far more considerable part has originated at times immediately antecedent, when the waters of the Mediterranean were already inhabited by the existing species of testacea."—*Lyell*.

Since there is no room for doubt, and much food for reflection, in the foregoing double narrative of Apollodorus, it is consequently with an interest and respect begotten of geologic lore that we must read the numerous allusions to the Giants and Typhaon, or Typhœus as he is otherwise called, in the classic poets. They all embody the same idea, the igneous rocks; but when comparison is made, the distinction is always well-marked between the purely intrusive giant traps and the volcano that belches forth smoke and fire. The latter lusts for supreme sway and relies upon the extent and might of those mountain arms wherein nestle a hundred volcanic heads; the former endeavour to scale to heaven on the step-like terraces of trap, and fight with thrust-up rocks and massive trunks of trees.

The distinctive comparison is well-marked by Horace :

Magnum illa terrorem intulerat Jovi
Fidens juvenus horrida brachiis,
Fratresque tendentes opaco
Pelion imposuisse Olympo.—C. iii. 4.

Again, the volcanoes, while numerous, are still but *one*, Typhaon,—one in construction, one in action, one in mode of dying; the history of one is the history of all. Not so with the traps; offspring of the same parents, they are as like and unlike as brothers: as unlike as spotted serpentine is to porphyry, syenite to the resonant clinkstone, as all these to diabase and melaphyre; as like as it is possible for individuals to be in whose veins runs the same blood, who are actuated by the same desires, and banded together for a common purpose. This idea is well expressed by Virgil in his *Georgics*, I. 278 :

Tum partu Terra nefando
Cæumque, Iapetumque creat, sævumque Typhoea,
Et conjuratos cælum rescindere fratres.
Ter sunt conati imponere Pelio Ossam
Scilicet, atque Ossæ frondosum involvere Olympum :
Ter Pater exstructos disjecit fulmine montes.

The “igneous” theme serves to throw a new light, often a new reading, on many passages from the poets. Here is an instance of the latter from Horace :

domitosque Herculea manu
Telluris juvenes, unde periculum
Fulgens contremuit domus
Saturni veteris.—C. ii. 12.

And warrior sons of earth
By mighty force laid low,
Whence flaming danger shook
Old time abodes.

How pointless after all, in the ordinary sense, is the *ter* in the lines just quoted from the “Bard of Mantua.” Reiteration is its only redeeming feature. But if we bear in mind that this *ter* embraces Palæozoic, Mesozoic, and Cainozoic time, what a new meaning dawns upon us, one worthy of the understanding and of the poet, and one that brings up a host of geological recollections.

Ovid, as we would expect, does not forget in his *Meta-*
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morphoses to make mention of the igneous rocks. He too separates the trap giants from the volcanic Typhœus, and when writing of the former deftly weaves in, as will be observed, the tradition mentioned in Genesis vi. 4 and 11:

4. "There were giants in the earth in those days; and also after that, when the sons of God came in unto the daughters of men, and they bare [children] to them: the same [became] mighty men, which [were] of old, men of renown."

11. "The earth also was corrupt before God; and the earth was filled with violence."

Neve foret terris securior arduus æther,
Affectasse ferunt regnum cæleste gigantas,
Altaque congestos struxisse ad sidera montes.
Tum pater omnipotens misso perfrigit Olympum
Fulmine, et excussit subjecto Pelio Ossam.
Obruta mole sua cum corpora dira jacerent,
Perfusam multo natorum sanguine Terram
Immaduisse ferunt calidumque animasse cruorem,
Et, ne nulla suæ stirpis monimenta manerent,
In faciem vertisse hominum. Sed et illa propago
Contemptrix superum sævæque avidissima cædis
Et violenta fuit. Scires e sanguine natos.—Met. i. 151.

Nor more immuned the welkin than the lands;
For giants, as the common story goes,
Aspired to realms supernal, and in throngs
Thrust mountains upward to the stars on high.
Then through Olympus crashed the sire of gods,
All-powerful with the lightning's bolt, and shook
The Ossa from the Pelion underneath.
When their dread trunks by weight their own lay stretched,
Earth, with its offspring's reddened tide all strewn,
Soaked in, 'tis said, and vivified the gore;
And, that some tokens of the seed might last,
Changed on to shape of men: but that race too
Contemned the gods, showed eagerness intense
For slaughter dire, and violence pursued.
From blood you ought those born of blood to know.

In all this we see but the eruptive efforts of those igneous traps, many in number (*congestos*), and rearing themselves step by step (*Pelio Ossam*) on high through means of the terraced mountains they had thrust up or built up,—whichever way we like to construe "*struxisse*,"—until the surface action of air, water, and life, aided by the great oscillatory movements of the land itself, put an end to

their bold endeavours. But there is no allusion to volcanic action, or to aught connected with such action.

How different reads the following description of Typhœus from the same poetic hand. Here is no lack of that volcanic energy and drapery which we missed in the Giants; here we behold the tuggings of the lava-monster in the depths below, and its occasional efforts at vomiting fire and clouds of sand and dust, in the vain hope of building once again the whilom cones (*pondera terræ*) and craters nestling like towns within their rock-ribbed walls, and of evolving from its own substance such huge piles as *Ætna*, *Vesuvius*, and the like:

Vasta giganteis ingesta est insula membris
Trinacris, et magnis subjectum molibus urget
Ætherias ausum sperare Typhœa sedes.
Nititur ille quidem, pugnatque resurgere sæpe:
Dextra sed Ausonio manus est subjecta Peloro,
Læva, Pachyne, tibi; Lilybæo crura premuntur;
Degravat Ætna caput: sub qua resupinus arenas
Ejectat, flammamque fero vomit ore Typhœus.
Sæpe remoliri luctatur pondera terræ
Oppidaque, et magnos evolvere corpore montes.
Inde tremit tellus, et rex pavet ipse silentum,
Ne pateat, latoque solum retegatur hiatu,
Immissusque dies trepidantes terreat umbras.—Met. v. 346.

O'er giant limbs a large and three-caped isle
Was thrown; and now by its enormous mass
It presses hard the prone Typhœus down,
Who dared to hope for mansions in the sky.
Still does he strain, and often strives to rise;
But on his right hand is Pelorus couched,
Pachyne on the left; his thighs are weighed
By Lilybæum; Ætna bows his head;
'Neath which the resupine Typhœus spews
Vast clouds of sand, and vomits flakes of fire.
Oft tries he mounds of earth and crater walls
To build again, and mountains huge to frame
From substance all his own: then quakes the earth,
And fears the ruler of the dead and gone
Lest gape it should and hell's foundation be
Disclosed within the yawning chasm, and lest
Th' admitted light should fright the trembling shades.

We end, as we began, this "Story of the Gods of Old,"

with Hesiod. In the early part of his Theogony he tells how, in the separation of the incorruptible firmament from the heavens "that will pass away," Kronos

"from his sire cut swift and flung behind
The plans, hereafter to be claimed his own."

He then proceeds, partly consecutively, partly anticipatively:

τὰ μὲν οὔτι ἐτώσια ἔκφυγε χειρός·
ὅσσαι γὰρ ῥαθάμυγες ἀπέσσυθεν αἱματόεσσαι,
πᾶσας δέξατο Γαῖα· περιπλομένων δ' ἐνιαυτῶν
γεῖναι· Ἐρινῶς τε κρατερὰς μεγάλους τε Γίγαντας,
5 τεύχεσι λαμπομένους, δολίχ' ἔγχεα χερσὶν ἔχοντας,
Νύμφας θ' ἃς Μελίας καλέουσ' ἐπ' ἀπείρονα γαῖαν·

Theog. 182.

Not useless 'scaped the efforts of his hand;
For many as the blood-red liquid drops
That flowed therefrom, did Gē receive them all;
And in the course of ages speeding by
She brought the mortal passions to the world;
And mighty Giants, for their rigging famed,
Grasping their long spears close; and Nymphs she bore,
Called "Essences" on this benighted earth.

NOTES.

- 4 Ἐρινῶς κρατερὰς.—"The ruling passion, be it what it will,
The ruling passion conquers reason still."

Pope.

- 5 τεύχεσι.—The elevated plateaux or terraces of trap, whereby the giants hoped to mount to heaven.

τεύχεα, "implements of any kind; the rigging of a ship," or general *mounting apparatus*, whereby the sails are hoisted and sailors climb aloft. The word is so suspiciously like *τείχεσι*, "walls, or dikes," as to suggest a further examination of the original codices.

- 6 Μελίας—μελω, "to be an object of care, anxiety, or thought"; hence, "to be essential." The Nymphs (νύμφαι) are the *quiddities*, innate nature, or essences of things,—the *final answer* to repetitions of νῦν φῆς; "what then?" or as the Latin has it, *quid est? quid nunc?*

The myth is true. All three, Erinyes, Giants, and Nymphs, are relics of the primal Uranus: all three, the ruling passions, the burning lava, and the essences of things, are heirlooms received from the incorruptible, and the last to perish for man, for the earth as a whole, and for things material, respectively.

This parenthetic clause, so far as it relates to the Giants, points clearly enough to the tabular and columnar structure

of the trap rocks. It also apparently encourages the hope that the further narrative of these Giants would be resumed elsewhere in the Theogony; but as they are never alluded to by name again, and as the battle with Typhœus *immediately* follows the battle of the Titans, it is highly probable, almost certain indeed, that Hesiod considered the Giants and Typhœus as but different forms of the one class of rocks, the igneous,—in other words, that he held the same theory with regard to the trappean and volcanic rocks which Lyell favours and which M'Culloch formulates thus: "It is a mere dispute about terms to refuse to the ancient eruptions of trap the name of submarine volcanoes; for they are such in every essential point, although they no longer eject fire and smoke."

Additional confirmation is furthermore obtained from the poet's making use of the terms *Τυφάων* and *Τυφωεύς*; this latter he reserves for the volcanic outbursts; the former, Typhaon, "eruptive, overbearing, strange," he applies for comparative distinction to the traps, and unites him appropriately to the granite (Echidna), as noticed in lines 306-7 of the Theogony. There is consequently no real discrepancy, chronological or otherwise, between Hesiod's account and that of Apollodorus, and the conclusion is that while the later writer favoured the separation, the earlier one favoured the conjunction of the igneous rocks as a whole.

The Typhomachia of Hesiod may therefore be considered as a description of what ensued after the great Archæan struggle when the granite, gneiss, and metamorphic rocks were reduced to submission, and tamed sufficiently for the evolving purposes of life.

Serpentine, porphyry, greenstone, syenite, and the entire Trappean crew made fiery charges from the depths below upon the outposts guarding the life that was above. Some they devoured, others they hacked, others still they spitted with their spears, and more they trampled down, using the dismembered bodies as stepping stones to higher grounds. And when Life's cohorts still held their ground and gave back blow for blow, up to the rescue of its kindred trap

came the volcano, last and most lasting (as we know only too well) of the warring sons of earth. With arms that grasped the east and west, with feet that waded in the ever-during lava, with smoke and steam and sounds terrific, and above all with fire, did this Anak advance upon the earth, and from earth to heaven on the cones that served it for so many heads.

How they fought and how long, how they were subdued and when, is the subject matter of Hesiod's description,—a description inimitable, and scarcely inferior to his Battle of the Titans.

Notes are superfluous in his case; and we need only remark that the *ἡματι κέλνφ* is again the fateful Tertiary period of our earth's existence, and that the *φωναὶ* mentioned by the poet are true to nature and true in order. Volcanic eruptions are preceded, as a rule, by tremors that finally merge into distinct *shocks of earthquake*, and the sounds (*φωναὶ*) proceeding from these have been likened by writers and observers to "thunder," "a hollow booming," "the rolling of a heavy wagon," or "the bellowing of bulls." Then comes a series of *explosive reports*, which the poet alludes to as the "barking of dogs"; and *the rushing of steam* with a screaming noise like to that from a locomotive. Such accompaniments as thunder, lightning, hurricanes, and tidal waves, are well recognised in volcanic and seismic disturbances:

Αὐτὰρ ἐπεὶ Τιτῆνας ἀπ' οὐρανοῦ ἐξέλασε Ζεὺς,
ὀπλότατον τέκε παῖδα Τυφώεα Γαῖα πελώρη
Ταρτάρου ἐν φιλότῃ διὰ χρυσέην Ἀφροδίτην.
οὐ χεῖρες μὲν ἀαπτοι, ἐπ' ἰσχυρῇ ἔργματ' ἔχουσαι,
καὶ πόδες ἀκάματοι κρατεροῦ θεοῦ· ἐκ δέ οἱ ὤμων
ἦν ἑκατὸν κεφαλὰὶ ὄφιος, δεινοῖο δράκοντος,
γλώσσησι δνοφερῇσι λελειχμότες, ἐκ δέ οἱ ὕσσαν
θεσπεσίης κεφαλῇσιν ὑπ' ὀφρύσι πῦρ ἀμάρυνσε·
πασέων δ' ἐκ κεφαλῶν πῦρ καίετο δερκομένοιο·
φωναὶ δ' ἐν πάσῃσιν ἔσαν δεινῆς κεφαλῇσι
παντοίην ὅπ' ἰεῖσαι, ἀθέσφατον· ἄλλοτε μὲν γὰρ
φθέγγονθ' ὥστε θεοῖσι συνιέμεν, ἄλλοτε δ' αὖτε
ταύρου ἐριβρύχεω, μένος ἀσχέτου ὕσσαν, ἀγάρου,
ἄλλοτε δ' αὖτε λέοντος ἀναιδέα θυμὸν ἔχοντος,
ἄλλοτε δ' αὖ σκυλάκεσσιν ἐοικότα, θαύματ' ἀκοῦσα
ἄλλοτε δ' αὖ ροίζεσγ' ὑπὸ δ' ἤχεεν οὔρεα μακρά.

καὶ νῦ κεν ἔπλετο ἔργον ἀμήχανον ἥματι κείνῳ,
καὶ κεν ὄγε θνητοῖσι καὶ ἀθανάτοισιν ἄναξεν,
εἰ μὴ ἄρ' ὄξ' ἔνυ νόησε πατὴρ ἀνδρῶν τε θεῶν τε.
σκληρὸν δ' ἐβρόντησε καὶ ὄβριμον, ἀμφὶ δὲ γαῖα
σμερδαλέον κονάβησε καὶ οὐρανὸς εὐρύς ὑπερθεν,
πόντος τ' Ὀκεανοῦ τε ῥοαὶ καὶ τάρταρα γαίης.
ποσσὶ δ' ὕπ' ἀθανάτοισι μέγας πελεμίζεται' Ὀλυμπος
ὀρνυμένοιο ἄνακτος· ὑπεστενάχισε δὲ γαῖα.
καῦμα δ' ὕπ' ἀμφοτέρων κάτεχεν ἰοειδέα πόντον
βροντῆς τὲ στεροπῆς τε, πυρός τ' ἀπὸ τοῦ πελώρου,
πρηστήρων ἀνέμων τε κερανοῦ τε φλεγέθοντος.
ἔξε δὲ χθὼν πᾶσα καὶ οὐρανὸς ἡδὲ θάλασσα·
θῦε δ' ἄρ' ἀμφ' ἀκτὰς περὶ τ' ἀμφὶ τε κύματα μακρὰ
ρίπῃ ὕπ' ἀθανάτων, ἔνοσις δ' ἄσβεστος ὀρώρει·
τρέσσει' Αἰδῆς, ἐνέροισι καταφθιμένοισιν ἀνάσσων,
Τιτῆνες θ' ὑποταρτάριοι, Κρόνον ἀμφὶς ἐόντες,
ἀσβέστου κελάδοιο καὶ αἰνῆς δηϊότητος.
Ζεὺς δ', ἐπεὶ οὖν κόρθυνεν ἔον μένος, εἴλετο δ' ὄπλα,
βροντῆν τε στεροπὴν τε καὶ αἰθαλόεντα κεραυνόν,
πλήξεν ἀπ' Οὐλύμποιο ἐπάλμενος· ἀμφὶ δὲ πᾶσας
ἔπρεσε θεσπεσίας κεφαλὰς δεινοῖο πελώρου.
αὐτὰρ ἐπεὶ δὴ μιν δάμασε πληγῇσιν ἰμάσσας,
ῥριπε γυιωθεῖς, στενάχισε δὲ γαῖα πελώρη·
φλόξ δὲ κεραυνωθέντος ἀπέσσυτο τοῖο ἄνακτος
οὐρεὸς ἐν βήσσησιν Αἰτῆς παιπαλοέσσης,
πληγέντος· πολλή δὲ πελώρη καίετο γαῖα
ἀτμῇ θεσπεσίῃ καὶ ἐτήκετο, κασσίτερος ὥς
τέχνη ὕπ' αἰζῶν ὑπὸ τ' εὐτρήτου χόανοιο
θαλφθεῖς, ἡὲ σίδηρος, ὅπερ κρατερώτατός ἐστιν,
οὐρεὸς ἐν βήσσησι δαμαζόμενος πυρὶ κηλέῳ
τήκεται ἐν χθονὶ δίῃ ὑφ' Ἥφαίστου παλάμῃσιν.
ὥς ἄρα τήκετο γαῖα σέλα πυρὸς αἰθομένοιο.
ρίψε δέ μιν θυμῷ ἀκαχὼν ἐς Τάρταρον εὐρύν.—Theog. 820.

When Zeus the Titans had expelled from heaven,
Revolving earth, with Tartarus conjoined
In love's most ardent tie, Typhœus bore,
Last and most lasting of her children all.
His hands, that served as barriers for strength,
Baffled comparison; his parts below
Were everduring as a mighty god's;
A hundred snaky, dreadful dragon heads,
That licked all over were with lurid tongues,
Sprang from his shoulders; and from eyes of his,
Under the brows of these most wondrous heads,
There darted fire,—from every head of his
That gazed upon the light was kindled fire.
And sounds of every sort and hard to tell
A going were in all those fearful heads:
They one time sounded like to warring gods;

At others to the roaring of a bull
 Loud-bellowing, lordly, and of strength unmatched,—
 Or that of lion swayed by hungry feel;
 Anon 'twas, strange to hear, like barking dogs;
 And yet again it rushed with hissing scream,
 And the long ranges echoed from below.
 And haply now a deed past mending quite
 On that most noted day were done, and ruled
 O'er gods and mortals he might have, had not
 The sire of gods and men been quick to see.
 Then he the thunder hoarse, intense, sent forth;
 And earth's expanse, and heaven's broad dome above,
 The sea, the ocean's springs, and nether depths,
 Rang with the deaf'ning sound; then roused to wrath
 This Anak's everduring feet convulsed
 The earth, and shook Olympus far and wide.
 Then did the burning tide beneath these two
 Invade the dark-blue sea, while ever raged
 The thunder, lightning, stormy winds, the bolt,
 And fire from this phenomenon so strange.
 Then steamed the all of earth, and heaven, and sea;
 Then surged the long waves round and round the shores
 Under the rushing of immortal powers;
 And ceaseless quaking of the earth was roused.
 The god that rules the dead and gone beneath,
 Th' abysmal Titans all round Kronos ranged,
 Shook with the ceaseless din and dreadful strife.
 But now when Zeus massed *all* his strength, and grasped
 His weapons, thunder, lightning, flaming bolt,
 Rushing from his Olympian home he sprang
 He smote, and blew off all the awesome heads
 Of this phenomenon so passing strange
 At length when scourged and tamed with blows it fell
 Dismembered down, and earth revolving shook,
 This thunder-scarred, this blasted Anak's fire
 Broke loose in time-worn glens of Ætna's mount;
 And by the awful heat revolving earth
 Was far and wide consumed, and melted like
 The tin that's melted 'neath a wide-oped pit
 Under the cunning skill of brawny men,—
 Or iron, most tenacious, that, reduced
 By ardent fire in mountain depths, is fused
 Within the glorious earth 'neath Vulcan's hands.
 By the wild blaze of deflagrating fire
 Was earth consumed like this: then anguished sore
 She plunged it down to wide and troubled depths.

THE END.



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